Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

AUGUST 1954

FOR OFFICERS AND SUPERVISORS RESPONSIBLE FOR DESIGN, CONSTRUCTION AND MAINTENANCE OF MOTIVE POWER AND ROLLING STOCK

formerly Railway Mechanical and Electrical Engineer

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Every Buffalo Truslock Brake Head furnished for maintenance and stand-by stocks is shipped to you complete with retaining spring key and cotter pin included in the cost of the brake head.

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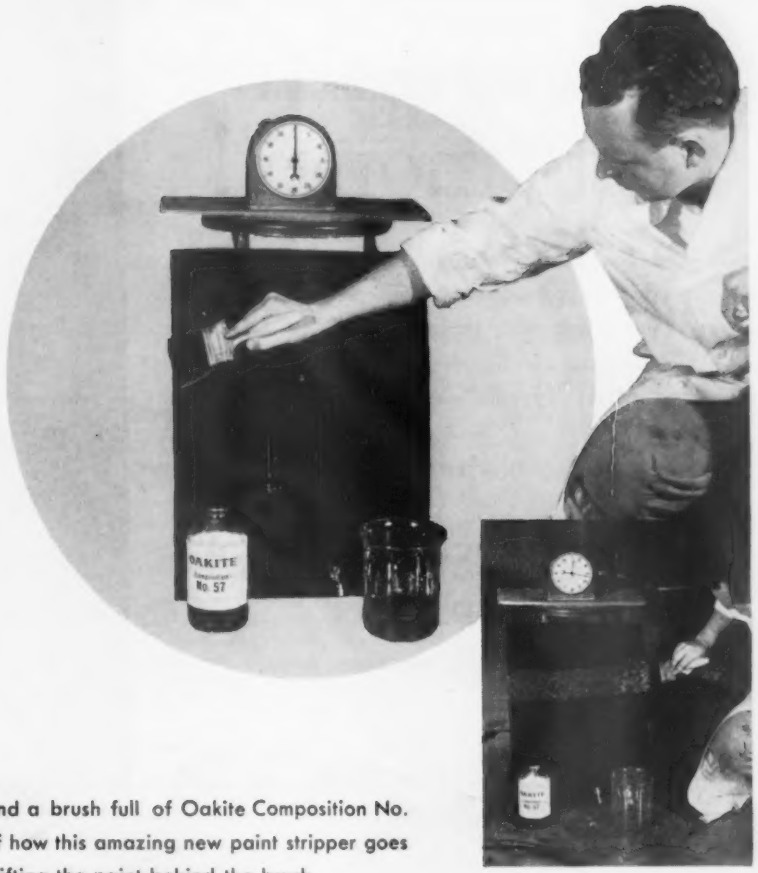

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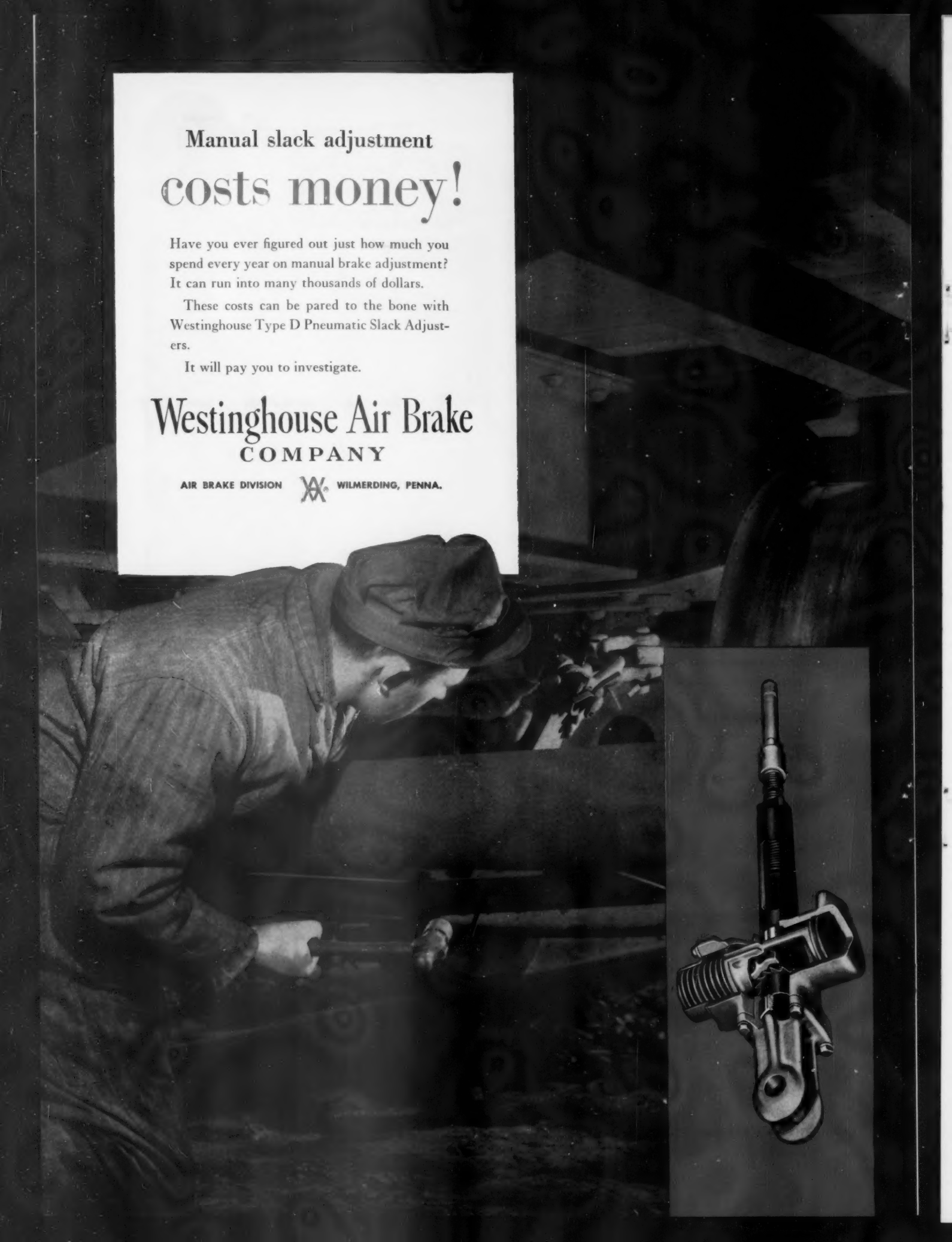
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Westinghouse Air Brake
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WILMERDING, PENNA.

August, 1954
VOLUME 128
No. 8

RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal.

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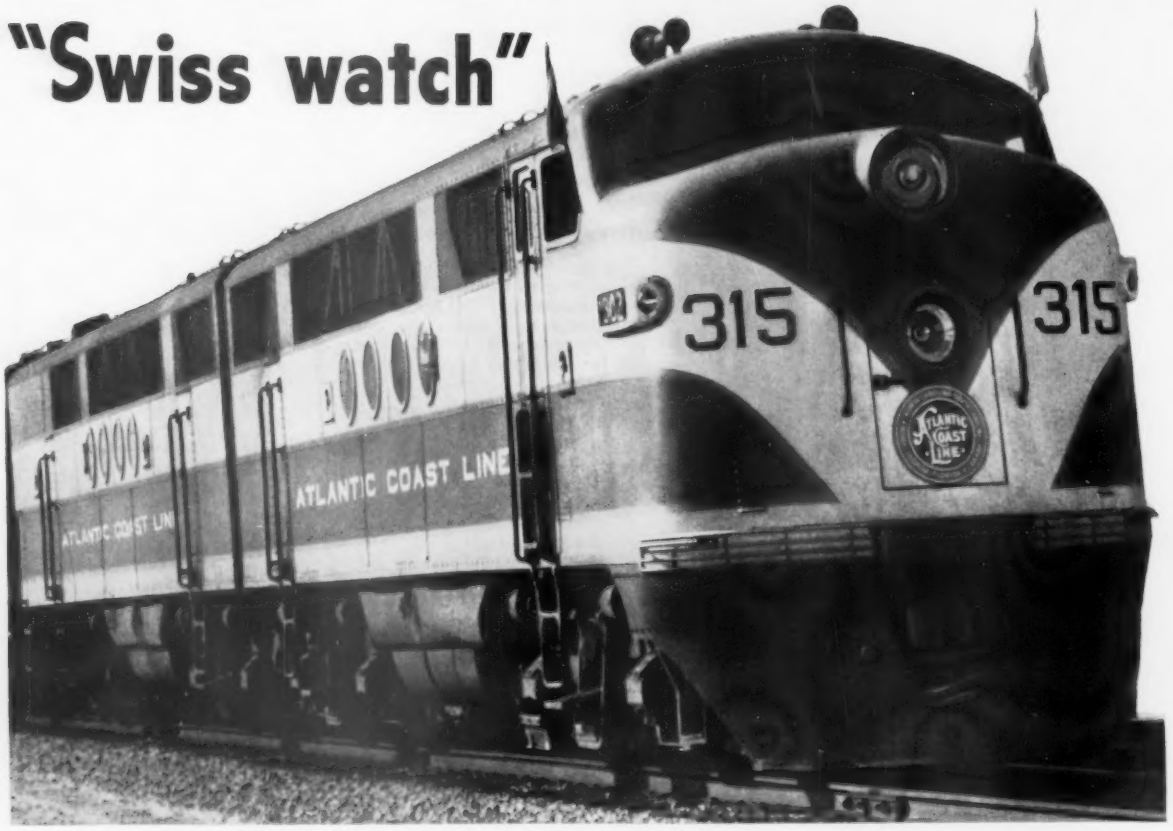
300 TON

"Swiss watch"



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News and Personals

Boilermakers Have New Chief

CHARLES J. MACGOWAN, president of the International Brotherhood of Boilermakers & Blacksmiths has resigned. Mr. MacGowan, who had continued in office against his personal desires, said that the "gigantic tasks ahead require the services of a younger and more rugged person."

William A. Calvin, one-time vice-president and more recently assistant to president, has been named as Mr. MacGowan's successor.

Freight-Car Backlog Declines

THE DISPARITY between freight car retirements and replacement orders highlighted a July 1 Washington meeting of representatives of the car-building industry and officials of the Department of Commerce's Business and Defense Services Administration. Car builders represented included railroads which build equipment in their own shops as well as the contract builders.

G. Metzman, chairman and president of the American Railway Car Institute, warned that with new car orders "not even approaching" retirement rates of 60,000 cars a year, "a sizable increase in carloadings could quickly result in shortages of certain types of cars." He stated that there is "a deficiency of 82,000 cars" under the 1,850,000 car goal set by Class I railroads for the end of this year.

"Railroads must maintain," he declared, "an adequate ownership of freight cars in peacetime as well as emergency to meet shippers' needs and retain their inherent position in the transportation industry."

Moreover, he went on, "it is also necessary to maintain an effective, efficient independent car building industry. The railroads alone cannot build sufficient equipment to meet all requirements." Mr. Metzman recommended that the independents be "maintained as an effective, healthy industry and not as a standby industry."

However, he pointed out, while the car retirement rate remains steady, the backlog of new car orders has declined from 29,950 to 15,615 since the first of the year. Also, he went on, car builders' employment rolls have declined by 35% in the same period, with five of their plants shut down. Independent car builders, Mr. Metzman said, also are continuing to diversify their activities because of lack of car orders "and to keep their capital employed."

Other spokesmen for the industry questioned the possibility of any substantial increase in orders without a pickup in railroad business. Noting that there had been some recent increase in car loadings, they expressed apprehension over continued "subsidized" competition and suspension of tariffs proposing piggybank haulage by railroads. They also indicated that temporary freight-rate increases due to expire at the end of 1955 should be made permanent if the railroads are to continue purchases of new rolling stock.

Mr. Metzman said that, ideally, "production in all shops must average in excess of 90,000 cars annually."

With 650,000 freight cars now in service over 25 years of age and 112,000 in need of repairs, he continued, "total war would again place staggering demands upon the rail transportation system."

Owen Clark, defense transport administrator and interstate commerce commissioner, said that to cope with mobilization needs, 2,000 coaches and 2,500 sleeping cars for military use are urgently needed. He suggested building experimental cars as a means of getting the jump on conditions in the event of war. Predetermination of the type of cars needed, would save the country six months' building time, he said.

PERSONAL MENTION

Bangor & Aroostook

PALMER H. SWALES, principal assistant engineer at Houlton, Me., appointed assistant to mechanical superintendent, assigned to special duties.

RAYMOND H. MILLER appointed principal assistant engineer at Houlton, Me.

Boston & Maine

GEORGE D. MCELROY, general car foreman at East Deerfield, Mass., appointed general car foreman at Concord shops. Position at East Deerfield abolished.

Canadian National

DOUGLAS V. GONDER, general superintendent motive power and car equipment Atlantic Region, named assistant vice-president, operations, at Montreal.

Illnois Central

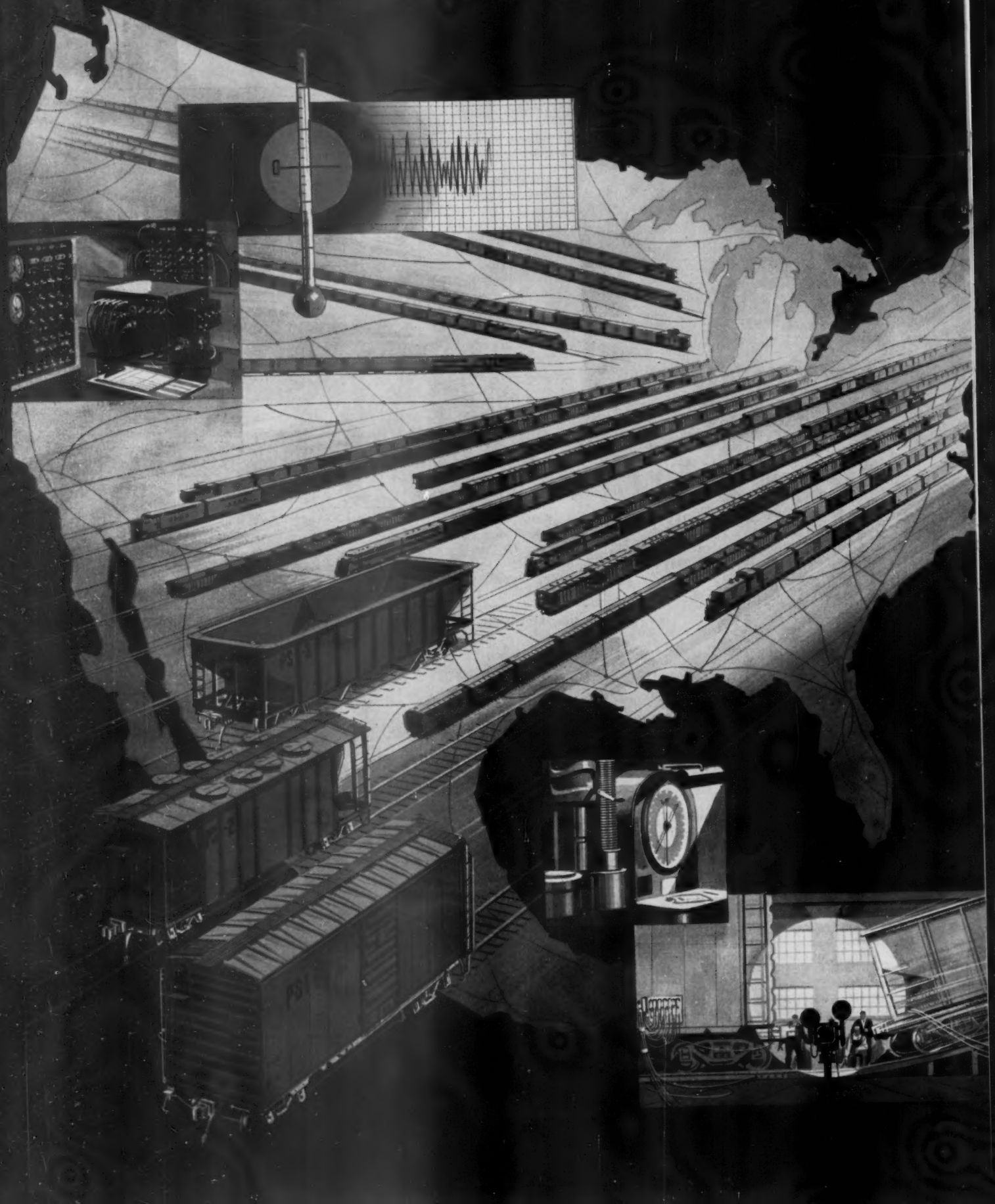
ALBERT G. KANN, general superintendent motive power at Chicago, has retired.

JOHN A. WELSCH, superintendent motive power, appointed general superintendent motive power at Chicago. *Career*: Began on IC as call boy in 1916, later becoming

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (total)	Cars set off between division terminals account hot boxes			Miles per hot box car set off between division terminals
		System	Foreign	Total	
April, 1951	2,996,562,763	3,702	8,914	12,616	237,521
May, 1951	3,013,634,782	5,631	13,737	19,368	155,599
June, 1951	2,874,873,495	7,074	15,376	22,450	128,057
July, 1951	2,768,920,095	8,886	18,823	27,709	99,929
August, 1951	3,009,371,111	9,023	19,092	28,115	107,038
September, 1951	2,925,570,545	6,472	13,565	20,037	146,008
October, 1951	3,116,490,095	4,131	9,053	13,184	236,384
November, 1951	2,939,503,144	2,022	4,405	6,427	457,368
December, 1951	2,752,316,133	2,130	5,398	7,528	365,611
January, 1952	2,824,298,630	3,208	7,197	10,405	271,437
February, 1952	2,809,162,671	2,723	6,473	9,196	305,477
March, 1952	2,943,812,727	2,594	5,877	8,471	347,517
April, 1952	2,766,313,714	3,826	7,759	11,585	238,784
May, 1952	2,918,508,445	6,020	10,938	16,958	172,102
June, 1952	2,672,512,889	8,466	14,495	22,961	116,394
July, 1952	2,575,298,912	10,566	15,833	26,399	97,553
August, 1952	2,924,917,122	11,658	17,535	29,193	100,192
September, 1952	2,931,129,734	7,536	13,608	21,144	138,627
October, 1952	3,093,990,289	4,058	8,053	12,111	255,469
November, 1952	2,984,101,808	2,198	4,501	6,699	445,455
December, 1952	2,869,928,617	1,742	3,632	5,374	534,040
January, 1953	2,828,906,282	2,219	4,123	6,342	446,059
February, 1953	2,625,563,462	2,111	4,059	6,170	425,537
March, 1953	2,904,227,804	2,696	6,077	8,769	331,192
April, 1953	2,850,752,648	3,383	6,435	9,818	290,359
May, 1953	3,013,610,843	5,892	11,433	17,325	173,945
June, 1953	2,926,001,360	8,537	15,296	23,833	122,771
July, 1953	2,925,317,024	9,342	15,775	25,117	116,467
August, 1953	2,971,020,484	8,638	14,160	22,798	130,319
September, 1953	2,822,222,832	6,083	10,195	16,278	173,376
October, 1953	3,042,558,922	3,863	6,493	10,356	293,796
November, 1953	2,788,773,285	1,987	3,404	5,391	517,301
December, 1953	2,656,063,018	1,581	2,550	4,131	642,958
January, 1954	2,583,485,918	3,082	3,797	6,879	375,561
February, 1954	2,445,214,845	2,953	4,066	7,019	348,370
March, 1954	2,658,757,249	2,196	3,637	5,833	455,813
April, 1954	2,570,518,990	3,079	5,149	8,228	312,411

The best that science can



offer is none too good

for the

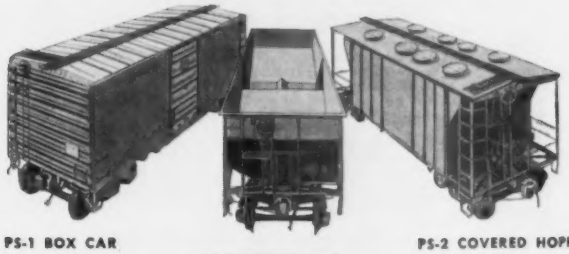
A typical box car (according to the A. A. R.) moves, in one year, on 39 different railroads, including two or more trips on 24 roads.

Therefore freight cars *should* be designed and built to operate efficiently and economically, wherever they are sent to earn revenue.

That is why Pullman-Standard uses every tested industrial science in designing and building the PS-1 Box Car, the PS-2 Covered Hopper Car, and the PS-3 Hopper Car . . . why new techniques of electronic analysis and computation are followed . . . why new methods of welding and metal testing are used . . . why new processes of precision construction are applied.

By adding new industrial sciences to the old, by combining them with the skills of experienced manpower, by taking full advantage of improved materials and specialized tools, quality cars are built at lower cost—cars to best serve the railroads, in earning greater revenue, anywhere on the Great American Railway System as well as on the lines of the purchasing road.

Built to serve best on the
GREAT AMERICAN RAILWAY SYSTEM



PS-1 BOX CAR

PS-3 HOPPER CAR

PS-2 COVERED HOPPER

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machinist apprentice, machinist, foreman, master mechanic, shop superintendent, superintedent car department, and super-

John A. Welsch

intendent equipment (1948). Appointed superintendent motive power in April of current year.

Long Island

PHILIP H. HATCH appointed general mechanical superintendent at Jamaica, N.Y. *Born*: Albany, N.Y., May 25, 1899. *Education*: Massachusetts Institute of Technology (B.S., 1921). *Career*: Student engineer with General Electric at Schenectady, N.Y., 1921-22. Became computer for

Philip H. Hatch

Cleveland Union Terminals in 1922. Joined New York, New Haven & Hartford in 1923 as special apprentice. Served in various mechanical department positions until November 1944 when he became general mechanical superintendent, and since June 1951 has been with Locomotive and Car Equipment Department of GE at Erie, Pa. From January to April 1954 served as consultant to the LI.

JOSEPH J. ORTLIEB, acting superintendent motive power, appointed mechanical engineer at Jamaica, N.Y.

New York Central

S. C. MORSE appointed supervisor of diesel records, with headquarters at Cleveland.

R. H. WRIGHT appointed assistant supervisor of diesel records, with headquarters at Cleveland.

E. J. BURDUE and H. F. UDELL have been appointed road foremen of engines, Lines West. They were incorrectly located at Detroit in the May issue, page 91.

Norfolk & Western

FRANK D. VEAZEY, master mechanic of the Shenandoah and Radford divisions at Shaffers Crossing, Roanoke, Va., has retired.

G. W. MEREDITH, master mechanic of the Pocahontas division at Bluefield, W. Va., transferred to Shenandoah and Radford divisions at Schaffers Crossing, Roanoke, Va.

W. M. TUCKER, assistant master mechanic of the Pocahontas division, at Bluefield W. Va., appointed master mechanic of the division.

Pacific Electric

ROY L. MANKINS, general foreman, appointed to head mechanical department at Los Angeles, with title of master mechanic. Mr. Mankins will supervise maintenance of freight locomotives and other equipment.

E. A. STEVENS, general superintendent motive power at Los Angeles, has retired.

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE JULY ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road	*No. of units*	*Horse-power*	*Service*	*Builder*
Babcock & Wilcox	1	50-ton	Industrial	Baldwin-Lima-Hamilton
General American Transportation Corp.	1	35-ton diesel-hydraulic	Industrial	Baldwin-Lima-Hamilton
Pittsburgh Plate Glass Co.	1	80-ton	Industrial	Baldwin-Lima-Hamilton

FREIGHT CAR ORDERS

Road	*No. of cars*	*Type of car*	*Builder*
Chicago & Illinois Midland	150[1]	50-ton box	Pullman-Standard
Chicago, Burlington & Quincy	150[2]	70-ton covered hopper	General American
Maine Central	15[3]	70-ton covered hopper	Pullman-Standard
Nashville, Chattanooga & St. Louis	12[4]	50-ton pulpwood	Company shops
New York, Chicago & St. Louis	1[5]	250-ton flat	Company shops
Pennsylvania	200[6]	Depressed center trailer transport	ACF Industries
Reading	50[7]	70-ton flat	Company shops
Reserve Mining Co.	350[8]	90-ton ore	
Rutland	50[9]	PS-1 box	Pullman-Standard
Wabash	50[10]	50-ton flat	Company shops

PASSENGER CAR ORDERS

Road	*No. of cars*	*Type of car*	*Builder*
Boston & Maine	42[11]	RDC-1	Budd Co.
	13[11]	RDC-2	Budd Co.
Canadian National	1[12]	RDC-1	Budd Co.
	1[12]	RDC-4	Budd Co.
	5[12]	Coach	Canadian Car & Fdry.
	1[12]	Sleeping	Canadian Car & Fdry.
Southern Pacific	10[13]	"Gallery" coaches	Pullman-Standard

PASSENGER CAR INQUIRIES

Long Island	120[14]	Coaches	

[1] Scheduled for delivery last month.
[2] Scheduled for October delivery. Estimated unit cost, $10,664.
[3] Scheduled for delivery last month. Unit cost, $7,650.
[4] Expected to be in service this month. Approximate unit cost, $6,000.
[5] Scheduled for delivery end of last month. Estimated cost $48,000.
[6] For piggyback service. To cost over $2,000,000.
[7] Delivery scheduled for later this year. Cost, $525,000.
[8] For delivery next year. Builder's name not disclosed.
[9] This, the road's first order for new freight equipment in 30 years, is part of the road's new equipment program which will, according to the road's president, Gardner A. Caverly, spread over "the next several years."
[10] Scheduled for delivery during this month and September.
[11] Deliveries of the RDC's to begin in December and continue at the rate of two units a week. When deliveries are completed, the B&M's RDC's will operate as a total of 170 daily trains, ranging in size from two to six units. RDC's now in B&M service are operated as 42 trains. According to J. D. Sughrue, president of the B&M, this investment the largest ever made by the road, will perm t the road to scrap or dispose of approximately 235 older type commuter coaches and 75 steam locomotives thus ending use of steam power.
[12] The RDC's are scheduled for delivery this summer. Delivery of the coaches and sleeping cars expected to be completed this year.
[13] *Southern Pacific.*—To provide facilities suggested by SP commuters who recently inspected and rode in a gallery car borrowed from the Burlington, the seating capacity of the SP cars will be reduced by three to 145. The cars will have more toilet facilities; cooled drinking water; foam rubber seats; disk brakes; tinted windows; and self-contained air conditioning and zone heating and cooling equipment. The road has also indicated that the new cars "and possibly some other trains in this service" will be handled by diesel locomotives.
[14] *Long Island.*—Bids closed on July 28 on a fleet of new air-conditioned passenger cars which the Long Island will put into service next year as part of a $58,000,000 improvement program. The initial order will be for 120-passenger, single-deck reversible coaches expected to cost about $15,000,000. After a year, another $9,000,000 car order will be placed. "Until all bids are in, we won't know exactly how many cars that $15,000,000 will buy, but we expect it will be well over 100." Thomas M. Goodfellow, newly designated general manager, said.

NOTES:

Bangor & Aroostook.—Directors of the B&A have authorized purchase of 350 refrigerated cars, to cost an estimated $3,500,000, for delivery early next spring. Delivery of the cars is expected to complete a refrigerator- and insulated-car program begun late in 1950 with the purchase and rebuilding of 350 second-hand units.

Boston & Maine.—The B&M has authorized the purchase of 12 diesel units.

Chicago, Rock Island & Pacific.—The Rock Island has indicated its intention to purchase from ACF Industries, at an approximate cost of $600,000 a four-car train combining many basic design features of the "Talfo" train. Each car will consist of three articulated units. Total seating capacity of the train will be 300.

Delaware, Lackawanna & Western.—The Lackawanna has requested bids for the construction of 500 to 1,000 50-ton box cars, builders being asked to present alternative bids—to the railroad's designs and to the builder's own. The road hopes contracts can be placed to assure that delivery will begin this year.

NOT A CRACK IN A CARLOAD

when the car is cushioned with "RAILWAY" SPRINGS

Fragile freight shipments arrive intact—and with no lading claims to follow—in cars equipped with "Railway" springs.

These rugged, long travel coil springs pamper your loads in a way that pleases your shippers, cuts wear and tear on your rolling stock and lowers roadbed maintenance costs.

Specify "Railway" on your next order, and get the expert services of Alco, a pioneer in the development of all types of springs to assure longer life and smoother operation for rolling stock.

RAILWAY STEEL-SPRING DIVISION

AMERICAN LOCOMOTIVE COMPANY

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Photo courtesy: The Budd Company

The battery railroads can depend on!

Consistent selection of EDISON batteries to furnish standby power for modern, air-conditioned passenger car service is based on years of extensive railroad operating experience.

The reasons why so many roads today rely on this unusual battery may be summed up in one statement: most dependable power . . . at the lowest over-all cost. But behind this statement lies the profitable operating features that are exclusively EDISON.

Steel cell construction withstands rugged handling like no other kind of battery construction can. Electrically, EDISON batteries recover after discharge as rapidly as generator output permits—providing high road capacity, and virtually eliminating yard charging. And as for service life, roads using as many as 2000 sets of EDISON batteries in both air-conditioned and non air-conditioned cars report average service life *ranging from eighteen to twenty-six years.*

Find out now about EDISON'S exclusive advantages by sending for our bulletin 3802 and requesting a visit from the EDISON Field Engineer nearest you. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

AIR GRINDER

Removes More Metal FASTER • EASIER • SAFER at LOWER COST!

Series 00
20,000 rpm

Series 1
12,000 rpm

Series 2
Cone Grinder

Series 2
Angle Grinder

Series 3
Straight Grinder with Arbor Extension

Series 4
Heavy Duty

Series 3
Surface Grinder

There's a size and style to fit all your grinding applications!

Check these advantages over any previous air grinder:

- Over-speed Safety Coupling
- More power
- Quieter exhaust
- Adjustable exhaust positions
- Arbor Bearings are permanently lubricated
- Easier to carry — better balance
- Sure seating rubber-faced throttle valve
- Four types of handles available

One of our AIR engineers will gladly provide a convincing metal removing demonstration of these powerful grinders. There's no obligation on your part — just phone or write — we'll do the rest.

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8-95

Pennsylvania

Eastern Region

L. B. TOWNSEND, Jr., foreman, Renova engine-house, Susquehanna division, appointed foreman, Northumberland engine-house, Susquehanna-division.

F. A. TOBEY, assistant road foreman of engines, Wilkes-Barre, Susquehanna division, appointed assistant road foreman of engines, South Philadelphia, Philadelphia Terminal division.

C. R. GRONINGER, special duty egineman, Middle division, appointed assistant road foreman of engines, Wilkes-Barre, Susquehanna division.

Central Region

M. P. PETROWITCH, assistant engine-house foreman, Shire Oaks, Pa., Pittsburgh division, appointed assistant enginehouse foreman, South Fork, Pa., Pittsburgh division.

St. Louis-San Francisco

R. A. RORIE, JR., appointed trainmaster-road foreman of equipment at Thayer, Mo.

W. D. SMITH appointed trainmaster-road foreman of equipment at Enid, Okla.

Southern

JOSEPH N. TODD, JR., appointed engineer quality control, Hayne shop, Spartanburg, S.C.

KIMBLE L. POLLITT appointed engineer cost control, Hayne shop, Spartanburg, S.C.

Southern Pacific Transport Co.

G. H. WILSHUSEN appointed mechanical engineer at Houston, Tex.

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of April 1954	Month of April 1953	4 months ended with April 1954	4 months ended with April 1953
3	Road locomotive miles (000) (M-211):				
3-05	Total, steam	5,496	12,132	26,589	50,096
3-06	Total, Diesel-electric	31,872	30,689	124,973	120,187
3-07	Total, electric	655	741	2,562	2,957
3-04	Total, locomotive-miles	38,120	43,620	154,436	173,477
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,466	1,653	5,836	6,523
4-06	Empty, total	854	900	3,425	3,524
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	10,966	22,052	50,746	88,180
6-02	Total in oil-burning steam locomotive trains	1,587	5,664	8,714	22,863
6-03	Total in Diesel-electric locomotive trains	88,028	85,975	342,328	334,631
6-04	Total in electric locomotive trains	2,025	2,135	7,803	8,297
6-06	Total in all trains	102,971	116,032	410,725	454,801
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.02	1.03	1.02	1.03
10-02	Loaded freight car-miles	41.00	41.00	40.50	40.80
10-03	Empty freight car-miles	23.90	22.40	23.70	22.00
10-04	Total freight car-miles (excluding caboose)	64.90	63.40	64.20	62.80
10-05	Gross ton-miles (excluding locomotive and tender)	2,881	2,880	2,847	2,842
10-06	Net ton-miles	1,265	1,305	1,252	1,283
12	Net ton-miles per loaded car-mile (M-211)	30.80	31.80	30.90	31.50
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car-miles	63.20	64.70	63.00	64.90
14	Averages per train hour (M-211):				
14-01	Train miles	19.00	18.30	18.90	17.20
14-02	Gross ton-miles (excluding locomotive and tender)	54,148	52,188	53,243	51,535
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	41.70	45.90	41.50	45.00
14-02	All	39.50	43.80	39.40	42.90
15	Average net ton-miles per freight car-day (M-240)	770	901	768	877
17	Per cent of home cars of total freight cars on the line (M-240)	55.50	47.00	54.40	47.20

PASSENGER SERVICE (DATA FROM I.I.C. M—213)

3	Road motive-power miles (000):				
3-05	Steam	2,233	4,431	10,122	18,953
3-06	Diesel-electric	20,675	19,888	82,298	78,842
3-07	Electric	1,394	1,553	5,658	6,277
3-04	Total	24,303	25,872	98,079	104,073
4	Passenger-train car-miles (000):				
4-08	Total in all locomotive-propelled trains	242,282	260,188	978,405	1,046,498
4-09	Total in coal-burning steam locomotive trains	11,390	26,978	52,342	108,944
4-10	Total in oil-burning steam locomotive trains	7,380	12,865	31,476	58,874
4-11	Total in Diesel-electric locomotive trains	207,580	202,784	830,928	808,084
12	Total car-miles per train-miles	9.59	9.74	9.61	9.76

YARD SERVICE (DATA FROM I.C.C. M—215)

1	Freight yard switching locomotive-hours (000):				
1-01	Steam, coal-burning	291	597	1,311	2,406
1-02	Steam, oil-burning	49	108	210	454
1-03	Diesel-electric [1]	3,220	3,395	12,988	13,432
1-06	Total	3,571	4,122	14,552	16,381
2	Passenger yard switching hours (000):				
2-01	Steam, coal-burning	12	20	53	87
2-02	Steam, oil-burning	4	7	17	25
2-03	Diesel-electric	251	252	1,019	1,025
2-06	Total	293	311	1,198	1,267
3	Hours per yard locomotive-day:				
3-01	Steam	4.40	6.60	4.70	6.50
3-02	Diesel-electric [1]	15.00	16.40	15.10	16.30
3-05	Serviceable	14.30	14.90	14.40	14.70
3-06	All locomotives (serviceable, unserviceable and stored)	12.20	13.10	12.30	12.90
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.69	1.72	1.73	1.73
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	.75	.74	.76	.75

[1] Excludes B and trailing units.

SUPPLY TRADE NOTES

GENERAL ELECTRIC COMPANY.—As an additional step in its decentralization program, GE has divided its former Lighting and Rectifier department into two separate organizations—an Outdoor Lighting department with *L. Byron Cherry* as general manager, and a Rectifier department, *William J. Fleming*, general manager.

■

AMERICAN LOCOMOTIVE COMPANY.—*Robert H. Binkerd*, district sales manager at Dunkirk, N.Y., has been made district manager of the company's new sales office in the Frick building, Pittsburgh.

■

A. M. BYERS COMPANY.—*William E. Weber* has been appointed field service engineer in the Seattle, Wash., area. Mr. Weber will work out of the firm's San Francisco division, with an office in Seattle.

■

METAL & THERMIT CORP.—*H. E. Martin* has been elected president and a director. Mr. Martin was previously manager of the New York district of Babcock & Wilcox Co.

■

UNITED STATES STEEL CORPORATION, U. S. STEEL SUPPLY DIVISION.—*George R. Foster* has been appointed general sales manager, stainless steel division.

■

UNION ASBESTOS & RUBBER CO.—The *Heating & Cooling Materials Corp.*, New York, has been appointed sales representative for the Union Abestos & Rubber Co's heating and air conditioning units.

■

PYLE-NATIONAL COMPANY.—*Robert Geocaris* has joined the sales staff of the Multi-Vent Division. Mr. Geocaris was formerly sales engineer of the Grinnel Company. *Harris W. Gehl* has been appointed sales representative for industrial and railroad electrical products in Dallas, Tex., and *Raymond B. Saunders*, a sales representative in the New York district sales office.

■

WIX CORPORATION.—*Earl A. Mann* and *Robert E. Mann* of the Modern Supply Company have been appointed Chicago area representatives for Wix railroad products.

■

PITTSBURGH PLATE GLASS COMPANY.—*Herschel E. Post*, general sales manager, industrial finishes, at Pittsburgh, has been appointed general manager, Pacific Coast paint division, Torrance, Cal. *Howard J. Mather*, sales manager of

(Continued on page 94)

The SAFEST distance between two points

The safest, most efficient coupler for freight cars highballing on today's precision schedules, is the AAR Alternate Standard Type F Interlocking Coupler.

Safest because—in event of derailment the interlocking wings serve to keep cars in alignment with each other and prevent them from climbing or overturning.

Efficient because—it can be coupled with any standard AAR coupler . . . it is nearly 25% stronger than the E coupler . . . lowers maintenance by minimizing free slack.

For maximum safety and efficiency—specify National Quality-Controlled Type F Interlocking Couplers and National Multi-Pad Rubber Draft Gears.

A-6111

NATIONAL TYPE-F INTERLOCKING COUPLERS

Technical Center Cleveland

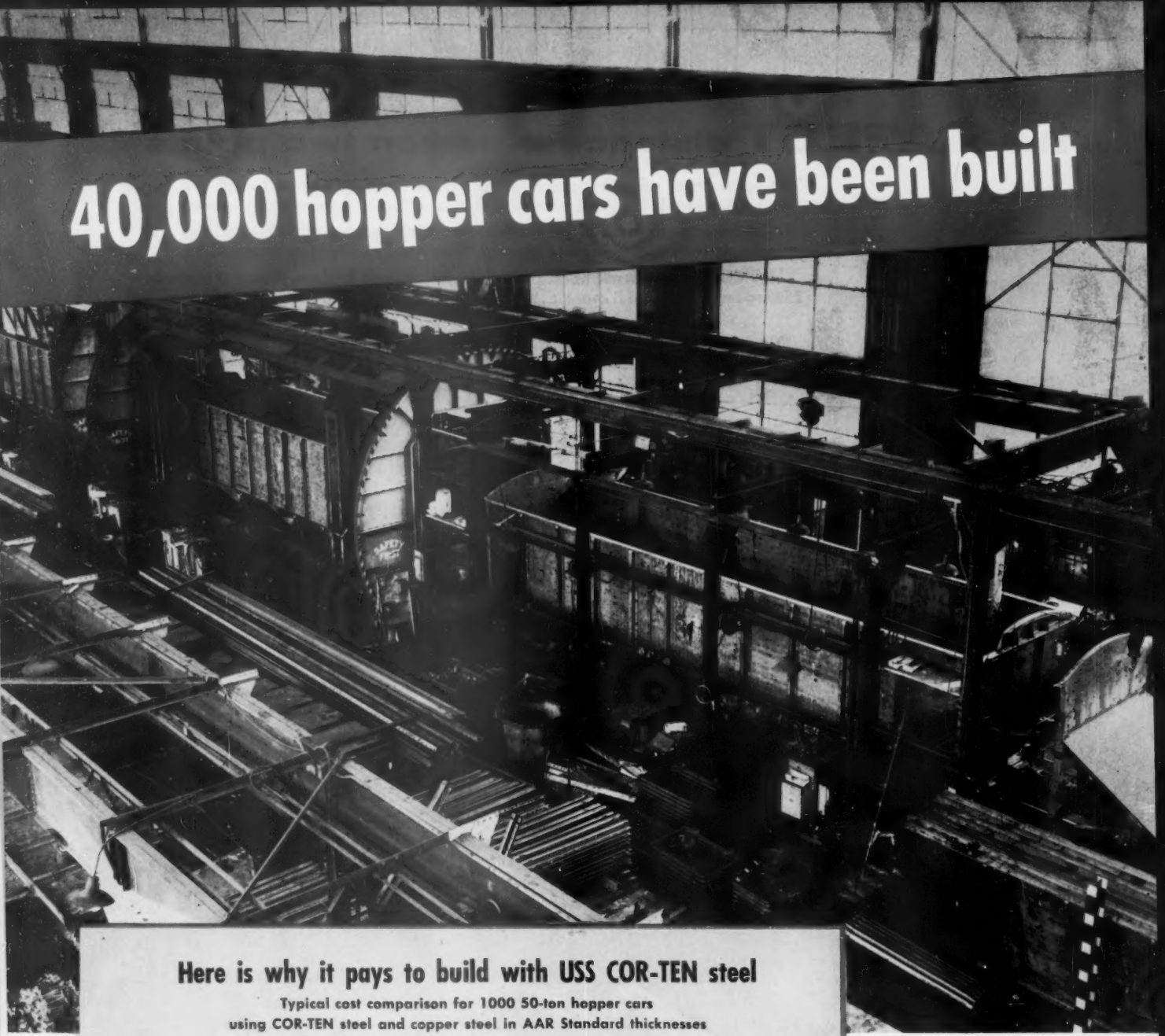
"Progress through Research"

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • SNUBBER PACKAGES • JOURNAL BOXES and LIDS

40,000 hopper cars have been built



Here is why it pays to build with USS COR-TEN steel

Typical cost comparison for 1000 50-ton hopper cars using COR-TEN steel and copper steel in AAR Standard thicknesses

CONSTRUCTION COST OF 1000 CARS	Cost of heavy repairs after 12 years at $1200 per car	Cost of heavy repairs after 18 years at $1370 per car	Cost of heavy repairs after 24 years at $1200 per car	Total cost of heavy repairs
Copper Steel at $5,000 per car $5,000,000	$1,200,000	.....	$1,200,000	$2,400,000
COR-TEN steel at $5,170 per car $5,170,000	.....	$1,370,000	.....	$1,370,000

Additional cost of COR-TEN steel..$170,000
Per car...$ 170

Total Repair Saving by COR-TEN steel	$1,030,000
Additional cost of COR-TEN steel construction	$ 170,000
Net Repair Saving by COR-TEN steel	$ 860,000
Net Saving per car	$ 860
Ratio of Net Saving to Additional Cost	506%

• Here being assembled are a few of the 5,500 70-ton hopper cars built by American Car & Foundry Co. for the Chesapeake & Ohio in 1950-51. High strength steel—mainly USS COR-TEN steel—was used for all body parts in contact with the lading.

USS HIGH STRENGTH STEEL

better with USS COR-TEN steel since 1933

COR-TEN steel construction pays for itself many times over

It costs about $170 more to build a 50-ton A.A.R. hopper car with body sheets of high strength, corrosion-resisting USS Cor-Ten steel of the same thickness as would be used in copper steel.

But this money is well spent—the use of Cor-Ten steel actually pays for itself many times over. First by saving the cost of one heavy repair and second by saving the time out of service such a repair involves.

COR-TEN steel construction cuts heavy repair costs 42%

USS Cor-Ten steel construction in hopper cars will last at least 50% longer than copper steel of the same thickness. Thus during the 36 years' normal life of a hopper car, a copper steel car will require *two* heavy repairs—one at the end of 12 years and another after 24 years' service, each costing about $1200, or $2400 in all.

In contrast, a Cor-Ten steel car will require heavy repairs *only once*, at the end of 18 years at a cost of $1370. Subtract from this saving of $1030, the $170 extra cost of Cor-Ten steel construction and you have a net saving of $860—*more than five times* the extra first cost of Cor-Ten steel construction.

COR-TEN steel construction cuts out-of-service time in half

These savings are further increased by the extra earning power that results from keeping cars serviceable—from having only one heavy repair in the life of the Cor-Ten steel car.

This can run into important money, for railroads tell us that many cars spend six months to a year, or even longer, waiting for enough cars to come in for repair to permit setting up a track for economical shop practice.

How many months do bad order cars lose on *your* railroad? With this figure in mind, consider the fact that the per diem that a freight car earns in only 71 days will pay the extra cost of applying Cor-Ten steel instead of copper steel in a 50-ton hopper car.

. . .

Now, ask yourself, does Cor-Ten steel construction justify its extra cost? We believe that your answer—like that of the present users of the 40,000 USS Cor-Ten steel hoppers—will be an emphatic, "Yes."

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

1933 UNITED STATES STEEL USS HIGH STRENGTH STEELS 1953
TWENTY YEARS OF PERFORMANCE

4-1249

UNITED STATES STEEL

Linking New England

with the rest of the Nation!

Connecting New England with the West, South and Southwest, the Lehigh & Hudson River Railway forms an important link via Maybrook, N. Y. Modern, powerful Diesel-Electric locomotives maintain a smooth flow of traffic on this essential route.

Sinclair GASCON® Oil in the crankcases of the engines, and Sinclair JET LUBRICANT TM in the traction motor gear cases help maintain this smooth operation.

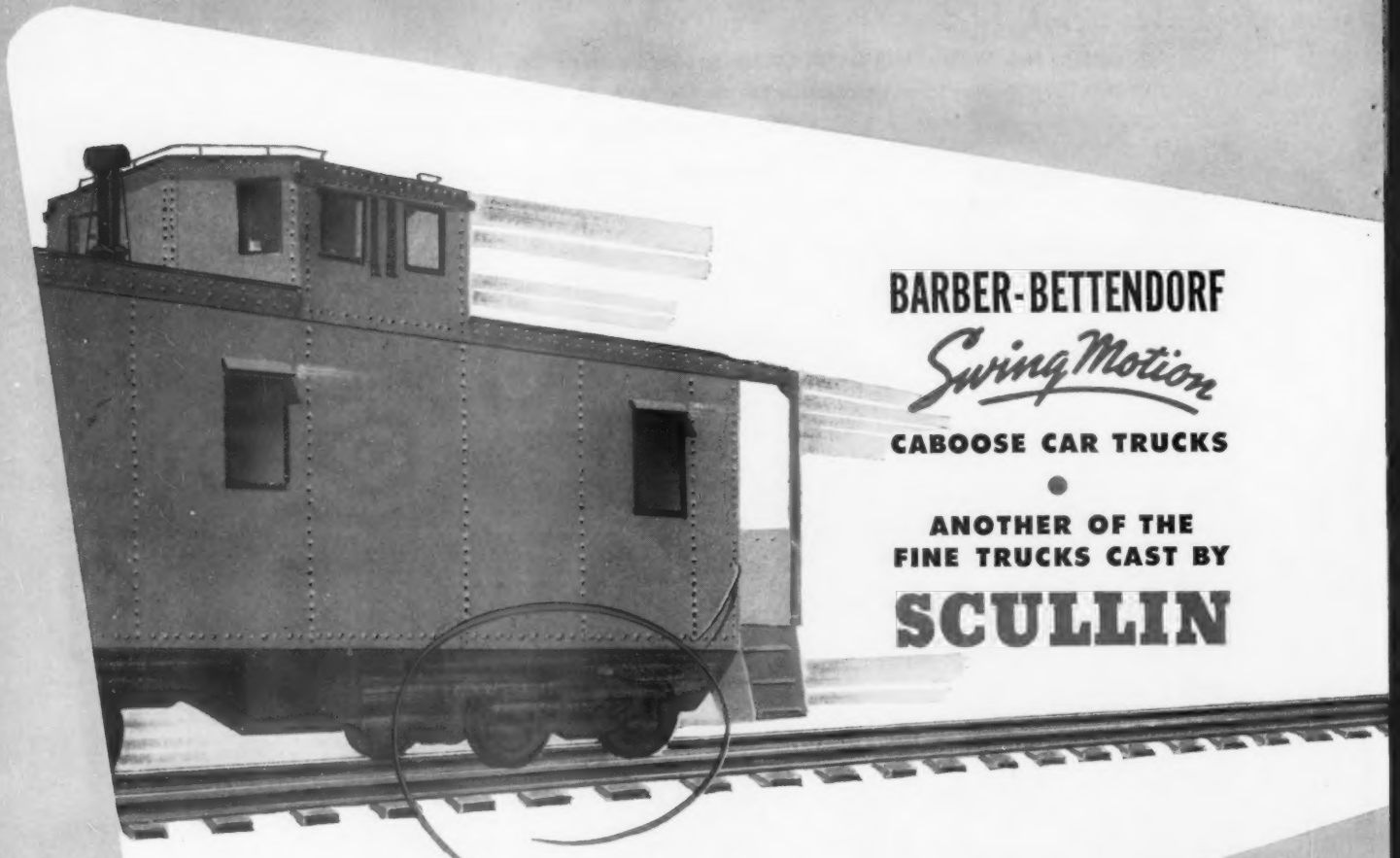
Both of these fine Sinclair Products for railway Diesel-Electric locomotives have an outstanding record on the Lehigh & Hudson River Railway. Are your locomotives enjoying similar excellence of operation?

SINCLAIR REFINING COMPANY

RAILWAY SALES • New York
Chicago • Houston

MODERN HIGH-SPEED, EASY RIDING

CABOOSE CAR TRUCKS



BARBER-BETTENDORF

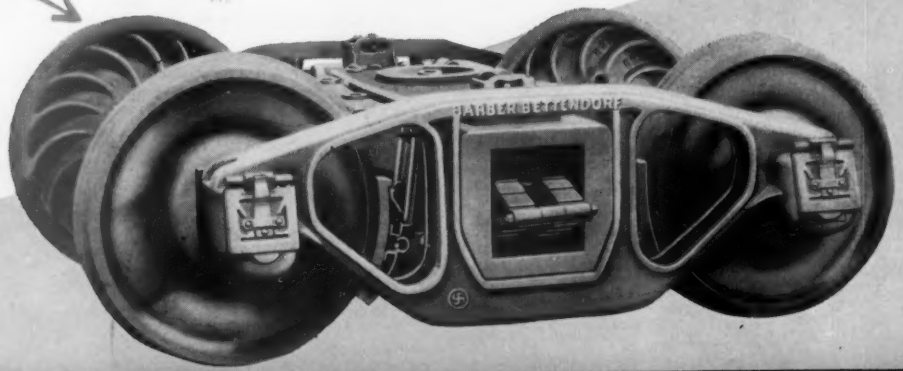
Swing Motion

CABOOSE CAR TRUCKS

●

ANOTHER OF THE
FINE TRUCKS CAST BY

SCULLIN



STEEL CASTINGS MANUFACTURER

NEW YORK
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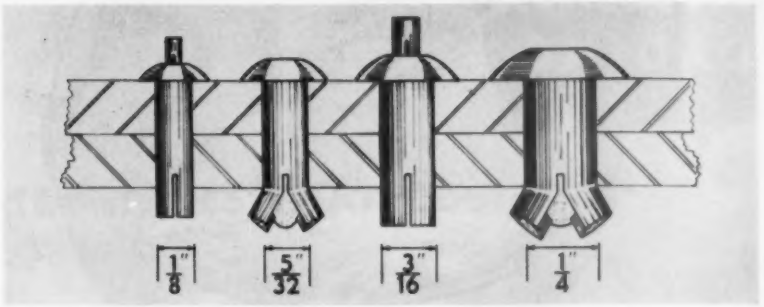
NEW DEVICES



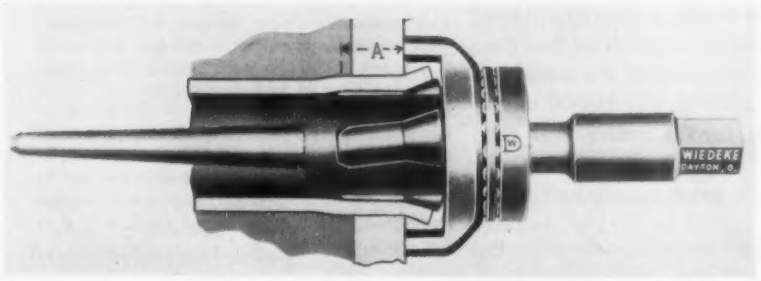
Blind Rivet

Installed from one side of the job by one man working without special tools, a new form of blind rivet can be applied with only a hammer.

The rivet is inserted into a hole, and the pin protruding from the head is stuck. Four prongs on the blind end of the rivet are thus expanded, forming a secure head and pulling panels tightly together. Since the head appearance is neat and attractive, no finishing operations are needed: no buffing or grinding, no stem to be trimed.

They are available in four diameters of 1/8, 5/32, 3/16, and 1/4 in. and in a range of sizes (grip lengths) from 1/32 to 5/8 in.

Southco Division, South Chester Corporation, Lester, Pa.



Boiler Tube Expanders

These tube expanders are available in a range of sizes for every package boiler requirement. The parallel rolling and flaring type tube expander has a guard which holds the flare roll back while the tube is being rolled and flared into tube sheet. It is equipped with a ball thrust bearing which is located between the guard and frame to reduce friction to a minimum.

A parallel rolling, non-flaring model is also available for re-rolling tubes after beading for touching-up leaky tubes after the unit has been in service.

Gustav Wiedeke Company, Dayton, Ohio.

Noise Locator

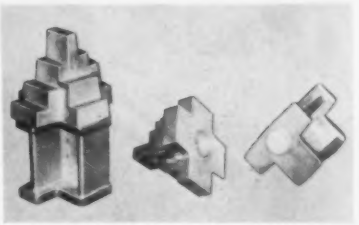
The Electronic Sound Probe, made by Gel-Me Company, is an instrument which changes mechanical vibrations into electrical energy, multiplies the sound volume and transmits it directly into earphones. It enables users to diagnose and locate trouble spots in mechanically operating equipment of all sizes and types.

The amplifier unit is contained in a black wrinkle finish metal box. Plug-in type earphones are used in connection with

the amplifier for listening to the noises or mechanical disturbances which are to be contacted. The probe pick-up is attached by insulated cable to the amplifier box.

The Gel-Me Company, Bloomington, Ill.

■



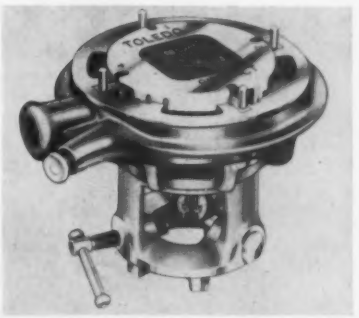
Aluminum Alloy Set-up Blocks

Multi-step set-up blocks, fabricated from aluminum alloy to withstand heavy weights under clamping pressures, have been made available. According to the manufacturer, these blocks save set-up time, protect the machine tables from scratches and nicks and absorb metal chips.

Used on jig borers, boring mills, drill presses, milling machines, planers, etc., the blocks hold work from zero to 3 in. and can be mounted on 3-in. risers and thus pyramided to any desired height. The tee shape of the riser block allows rotation of the set-up block to coincide with the tee base for maximum rigidity. The devices are packaged in sets of four, two multi-step blocks and two risers.

Jergens Tool Specialty Company, Cleveland 10.

■

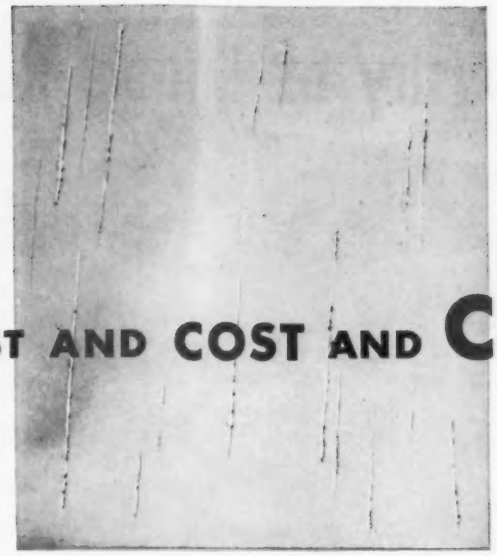


Ratchet Threader

The Simpact 1- to 2-in. self-contained ratchet threader has been made available with an improved cam-type quick-action pipe holder. This holder has broader jaws to permit a positive grip on the pipe. Its free action cam set instantly to size.

Simplicity of design is said to reduce

(Continued on page 91)



SCRATCHES THAT COST AND COST AND COST

In Diesel Oil Filtration, too . . . An Ounce of Prevention Can Preserve the Life of an Engine

Almost too small to be seen, but large enough to destroy the efficiency of railroad Diesel engines, tiny scratches and abrasions on engine parts are caused by the grit and dirt picked up by fuel and lube oils in railroad service. This grit, plus the sludges and gums that foul engine parts, cost railroads many dollars in down time, replacement parts, repair and maintenance expense.

That's why WIX Engineered Filtration is so important to you. For WIX "Prescription" Filtrants are engineered, Laboratory tested and field proved for individual engine characteristics as well as variables in operating and climatic conditions—provide peak filtering efficiency in every type of service. WIX Engineered Cartridge construction assures precision fit, longer Cartridge life and ease of maintenance.

WIX has unmatched research and production facilities that are responsible for this great Line of Filter Cartridges for railroad service. From this combination of laboratories, plants and equipment has come many of the advances in modern filtration that stretch out oil mileage and preserve the life of engines. Ask us to show you what this specialization in railroad Diesel Filtration can do for you.

ENGINEERED FILTRATION

- **Selection of "Prescription" Filtrants: Cotton Threads, Blended Cotton Threads, Felted Paper.**
- **Uniform volume, density packed in one-piece Sock. Integral End-Seal or Grip-Seal Cartridge construction.**
- **Spring-reinforced center tube, slotted for greater, more even flow rates.**
- **Tin-plated metal parts. Bale-type handles for easy installation and servicing.**

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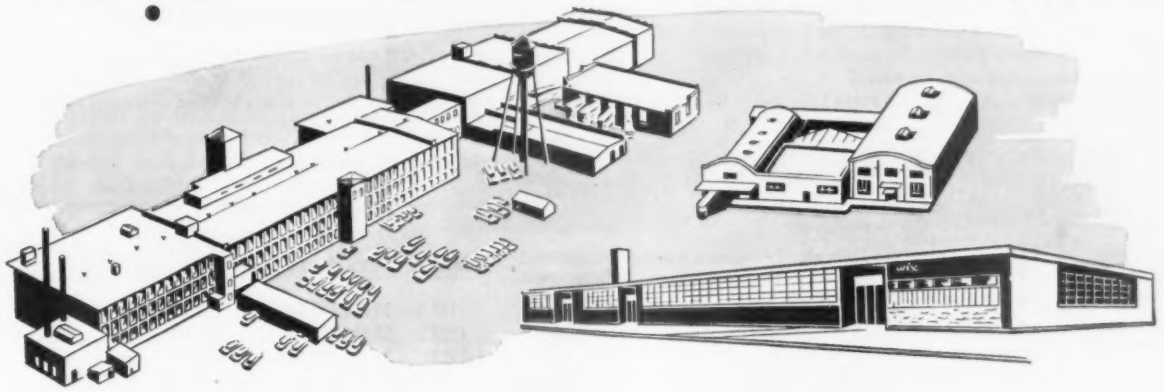


University of Illinois Report SUPPORTS of SOLID TYPE

Analysis shows that all labor and material costs for solid bearing operation, including overhead expense, come to less than fair wear and tear allowance and interest on huge initial investment necessary for so-called "anti-friction" bearings.

If you need further evidence that solid bearings are the best buy for freight cars, just study the University of Illinois report. It's called "An Economic Investigation of Solid Journal Bearing Operation on Two Large Class I Railways." When you analyze this report in the light of high roller-type bearing costs, the big economic advantage of solid bearings stands out clearly. For example, all costs for labor and materials required for solid bearing operation, even as projected by the University of Illinois, come to less than the fair wear and tear allowance and interest on the huge initial investment necessary for non-standard roller-type bearings. Since this is so, any direct comparison of costs is bound to show the solid bearing to much, much greater advantage. Of course, any direct comparison would have to consider costs for tools and facilities, extra skilled labor and time for periodic disassembly, inspection and reassembly of non-standard bearings, as well as reflect realistically their known incidence of failure — and the high cost of those failures, too.

Cost of Fair Wear and Tear and Interest Per-1000-Car-Miles

At today's prices (about ⅓ that of comparable bearings for passenger cars) the average extra investment required to equip a freight car with high-cost roller bearings is about $850.00. If interest is calculated at 4% and fair wear and tear, or actual depreciation, at 5%, the annual fixed charges on this extra investment would be $76.50 per car. This depreciation rate implies an average 20-year life for the non-standard bearings. If their average life proves to be less than 20 years, these annual fixed charges would be correspondingly higher.

In 1952 (the last year for which figures are now available) the average serviceable freight car moved 16,863 miles. Divide $76.50 by 16.863 and you get the extra cost of these fixed charges per-1000-car-miles, or $4.54, had this car been roller bearing equipped.

But according to the University of Illinois, maximum labor and material costs for solid bearing operation on one of the railroads studied were only $4.51 per-1000-car-miles. On the other road these same costs in 1951, the highest year, came to only $4.30 per-1000-car-miles — a big advantage in favor of solid bearings even when compared with the *fixed charges alone* for non-standard bearings.

It's important to note, too that wherever possible the University of Illinois used those unit costs for solid bearing labor and materials assigned by the AAR Code of Rules for Interchange. When this was not possible, as in the case of "freight lubrication labor," the cost was found by interpolation. Thus all items of labor and materials were charged at rates sufficient to cover indirect expense.

Applicability of the Report

Of course, it can be argued that a study made on two railroads should not be applied to others. That may be true. For one thing, the two roads studied averaged only 145,944

Freight Car Bearing Performance

The figures at the right clearly indicate a trend to improved journal bearing performance, even with today's faster train speeds and heavier loads.

Higher standards of maintenance and inspection, combined with selective adoption of available developments, can continue to improve solid bearing performance — to the point where the incidence of hot boxes may be reduced to insignificance.

PERIOD	TOTAL CAR MILES	CAR MILES PER HOT BOX	% INCREASE OVER 1951
1951	34,726,490,070	172,703	—
1952	34,313,975,558	190,109	10%
1953	34,355,017,965	219,762	27%

ECONOMIC ADVANTAGES

BEARINGS for freight cars

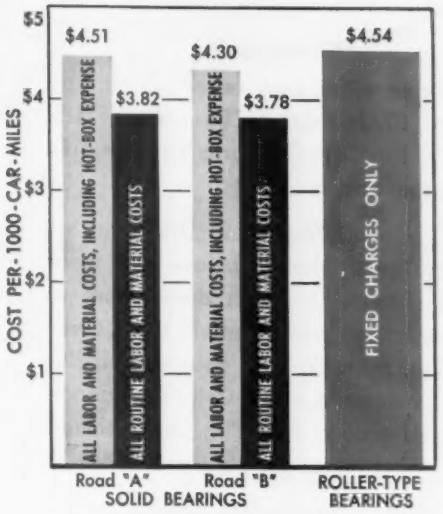
and 84,195 car miles per set-off in 1951 — or 15.9% and 51.2% *below* the average for all roads for that year, and respectively about 33.6% and 61.9% *below* the average miles per set-off for all roads for 1953. Perhaps partly for that reason, too, the consumption of certain materials on these two roads, as indicated by the report, is considerably above the experience of most roads.

The University has also apparently charged all car inspectors' time ($0.84 and $0.91 per-1000-car-miles respectively in 1951 for the two roads studied) to the solid bearing assembly. In one instance, 7.39 inspector man-hours per 57-car train dispatched are included as solid bearing costs. Actually, on most roads it probably would be found that few, if any, car inspectors could be reassigned with safety even if bearings were no concern at all. There are just too many other items for them to check — wheels, brake shoes, couplers, end sills, door seals, and countless other items. Of course, to the extent that car inspectors' time would be required for other considerations, a still greater economic advantage in favor of solid bearings will be apparent.

Car and Train Delays

Railroads will also want to examine carefully the cost and number of delays attributed to bearing operation by the University. For 1951, a car delay day is estimated to cost over three times the regular demurrage rate now charged by the railroads. This high figure is based on several highly debatable assumptions. It is contended that potential gross earnings are lost because of delays and that these fictitious earnings can be included as costs. It is also contended that the railroads are required to keep on hand additional cars because of delay days due to journal bearings. But problematical earnings cannot reasonably be calculated as costs. Nor is it possible to show any relationship between the size of the car fleet and any estimated number of delay days attributed to solid bearings, or any other bearing or other car part for that matter. In fact, the Research Advisory Committee of Journal Bearing Manufacturers has proved that no such direct relationship can exist. (See Railway Age, Feb. 4, 1952.)

The biggest single item of car delay expense is said to be associated with train yard lubrication. But the University estimates that the average 60-car train is held an hour and twenty minutes for journal box servicing and inspection, and the total delay days for train yard lubrication are calculated from that basis. This would indicate that, for this phase of the report at least, the slide rule may have been substituted for time study observation. It also overlooks the fact that cars so serviced are already *in a train*, either as loads or empties.



The above chart compares uncorrected University of Illinois figures for solid bearing costs with fixed charges only on the extra investment for non-standard bearings. If solid bearing costs are corrected in accordance with analysis above, the big economic advantage of solid bearings becomes even more apparent.

Value of the Report

Yet despite certain questionable assumptions and calculations, the University of Illinois report constitutes an earnest effort to contribute to the literature on journal bearing operation. Properly analyzed and applied, it proves the wisdom of present railroad policy to seek out and adopt the means for bettering standard bearing performance. For the most part, these means are already available. And as rapidly as they are adopted, solid bearing performance will improve still further. In fact, many roads are already showing significant improvement with higher maintenance standards alone. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

A HAPPY RIDER IS LIKE A MAGNET

. . . because he (or she) attracts more happy riders. That's why equipment that makes passengers happy and comfortable, like automatic air-conditioning and suitable lighting, must operate dependably. Simplex Car Wire helps make sure it does.

Simplex Car Wire is small in diameter for easy installation in less space and light in weight for convenient handling. Despite its small size and light weight, it sacrifices none of the qualities of long life, ability to withstand vibration, and resistance to abrasion, acids, heat, oil, and moisture.

Simplex Car Wire is made with a special rubber insulating compound that readily withstands oxidation. It retains its physical and electrical properties even in the presence of water and extreme heat. A tough neoprene jacket protects it against service-encountered hazards.

To help insure reliable functioning of comfort-producing equipment for passengers, specify Simplex Car Wire. A letter to the Railroad Department at the address below, or an inquiry of your nearest Simplex representative, will bring more complete information. Write or call them today.

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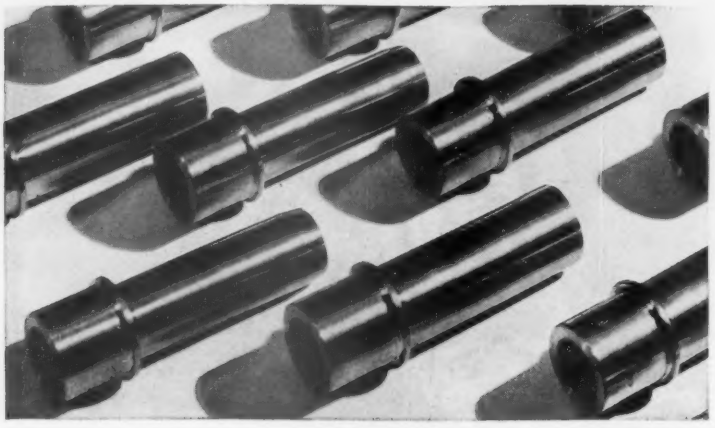

Valve Guides of Ni-Resist... combine exceptional resistance to corrosion, erosion and heat... along with excellent wear-resistance and machinability. The castings for the "finish-machined" units shown above were produced in Ni-Resist by American Hammered Piston Ring Department, Koppers Company, Baltimore, Md., for Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn.

Ni-Resist Valve Guides

Stand the Gaff

Under Severest Operating Conditions

Regardless of drastic increases in exhaust gas temperature, or of corrosive and erosive additives in chemically treated fuels, Ni-Resist® completely meets the need of modern heavy-duty gasoline and Diesel engines, as well as old type units that are "souped up" for increased power ratings.

Use Ni-Resist for valve guides in truck, bus, locomotive and stationary power plant engines... also in marine and reciprocating aeronautical engines. Because Ni-Resist provides the following basic advantages:

1. Resists severe wear by valve stems in motion.
2. Resists both corrosion and erosion by combustion products of chemically treated fuels.
3. Resists heat up to 1400°F., especially in flange portion of valve guides.

In addition, certain special applications take advantage of the fact that the thermal expansion coefficient of Ni-Resist is the same as that of high nickel-chromium austenitic valve materials commonly used in conventional aircraft engines.

No other cast metal provides such a useful combination of engineering properties.

Ni-Resist applications include ring groove bands in aluminum pistons, cylinder liners, exhaust manifolds, connector rings, exhaust seat rings and ball joints, water pump bodies and impellers.

Several types of Ni-Resist are available to meet a variety of industrial demands. Get full information... mail the coupon now.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Please send me booklets entitled, "Engineering Properties and Applications of Ni-Resist" and "Buyers' Guide for Ni-Resist Castings."

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

with NATIONAL BRUSHES

TRADE-MARK

Brush selection can never *replace* preventive maintenance – but "National" brushes *do* boost the pay-off obtained from regular, scheduled care of motors, generators and auxiliaries.

"National" brushes for diesel-electric locomotive service incorporate *proved* film-forming ingredients designed to establish and maintain ideal commutator surface. This surface, in turn, is easy on the brushes . . . provides optimum commutation and long brush life.

Don't wait for "problems" to expand your use of "National" brushes! Install them on every change-over and see how profitable preventive maintenance can *really* be!

How good is really good brush performance?...
Use "National" brushes and see!

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
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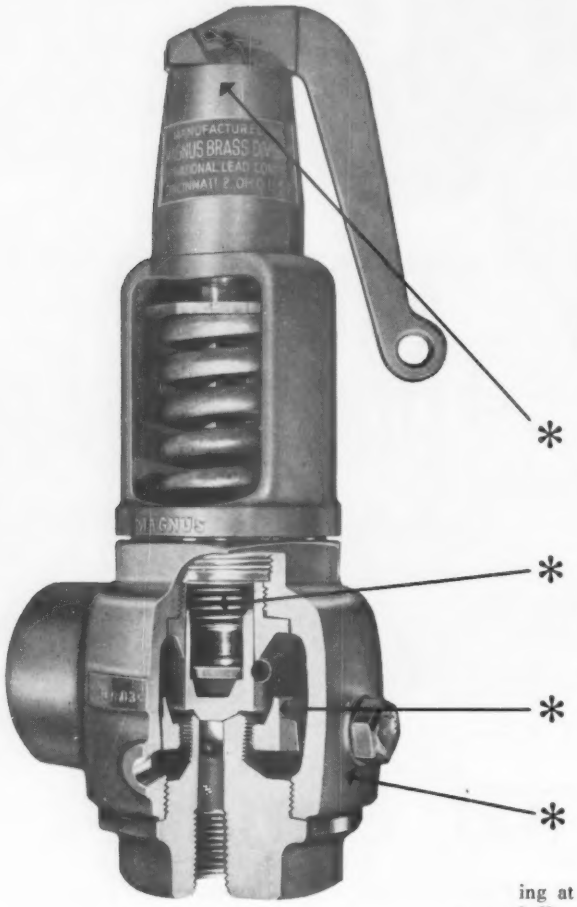
Here's REAL SAFETY* for diesel locomotive steam generators



MAGNUS 391 SAFETY VALVE . . .

the standard for many roads because of these important advantages

* Easy, accurate adjustment for opening pressure, from 245 to 300 psi, located under protective cover to prevent accidental change of setting.

* Special alloy metallic bellows prevents any steam from escaping into the steam generator compartment.

* Blow-down pressure ring easily adjusted and permanently locked in any position.

* Valve body of high strength Navy M bronze.

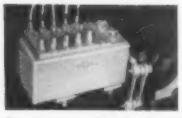
With Safety Valves you've got to be sure. You don't need them often, but you have to know they will work when you *do* need them.

That's why railroad after railroad is standardizing on Magnus 391 Safety Valves. Specially designed for steam generators, these rugged, durable valves have what it takes. The valve spring is a high-grade vanadium steel. Valve body and seat are silver-nickel-bronze alloy — specially machined and ground to avoid singing and chattering at any pressure. It's the only valve with a metallic bellows to prevent escape of steam into the steam generator compartment.

You can't beat Magnus valves for economy either. They can usually go for a year or more before any servicing will be needed. And individual parts, including main body parts, can be easily renewed at overhauls.

All Magnus valves are thoroughly tested and properly adjusted under steam pressure before they leave our plant. Blow-down normally set for 4% below opening pressures. For complete information write to Magnus Brass Manufacturing Company, 525 Reading Road, Cincinnati 2, Ohio.

other Magnus Brass products for diesel locomotives



D-16 FLANGE LUBRICATOR

Increases mileage between wheel turnings up to 40% — saves on shop expense and "down time" — saves with longer wheel life, too.

SIGHT GAGES FOR DIESEL FUEL TANKS

Flexible mounting to fit all standard diesel fuel tanks. Leakproof and practically indestructible.

Magnus Brass
Manufacturing Company
Subsidiary of **NATIONAL LEAD COMPANY**
525 Reading Road, Cincinnati 2, Ohio

THE ENGINEER'S REPORT

DATA

LUBRICANT RPM Delo Oil R.R.

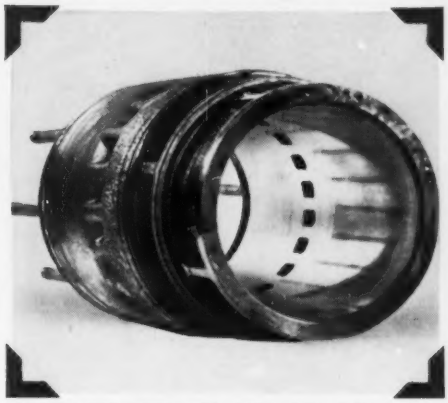
UNIT Diesel locomotive

SERVICE Mountain freight haul

CONDITIONS Long, continuous grades to 1.6%

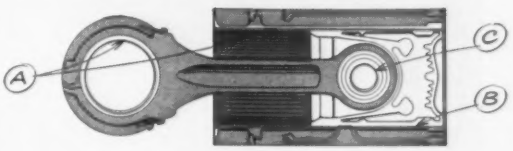
FIRM The Milwaukee Road

333,590 freight miles—only 0.0035 inch liner wear!



LUBRICATED WITH RPM DELO OIL R.R., this representative cylinder assembly was in good condition when pulled for regular inspection after 333,590 actual freight miles. Operation was on The Milwaukee Road's tough run between Othello, Washington, and Avery, Idaho. This liner, shown as it came from the engine, miked only 0.0035 inch wear, 0.001 inch taper, despite hard operating conditions—heavy loads, wide temperature variations, heavy grades, including one stretch of 20 miles of continuous 1.6 percent. Neither wristpin or bushing showed measurable wear.

How RPM DELO Oil R.R. prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent scuffing of cylinder walls.

C. Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

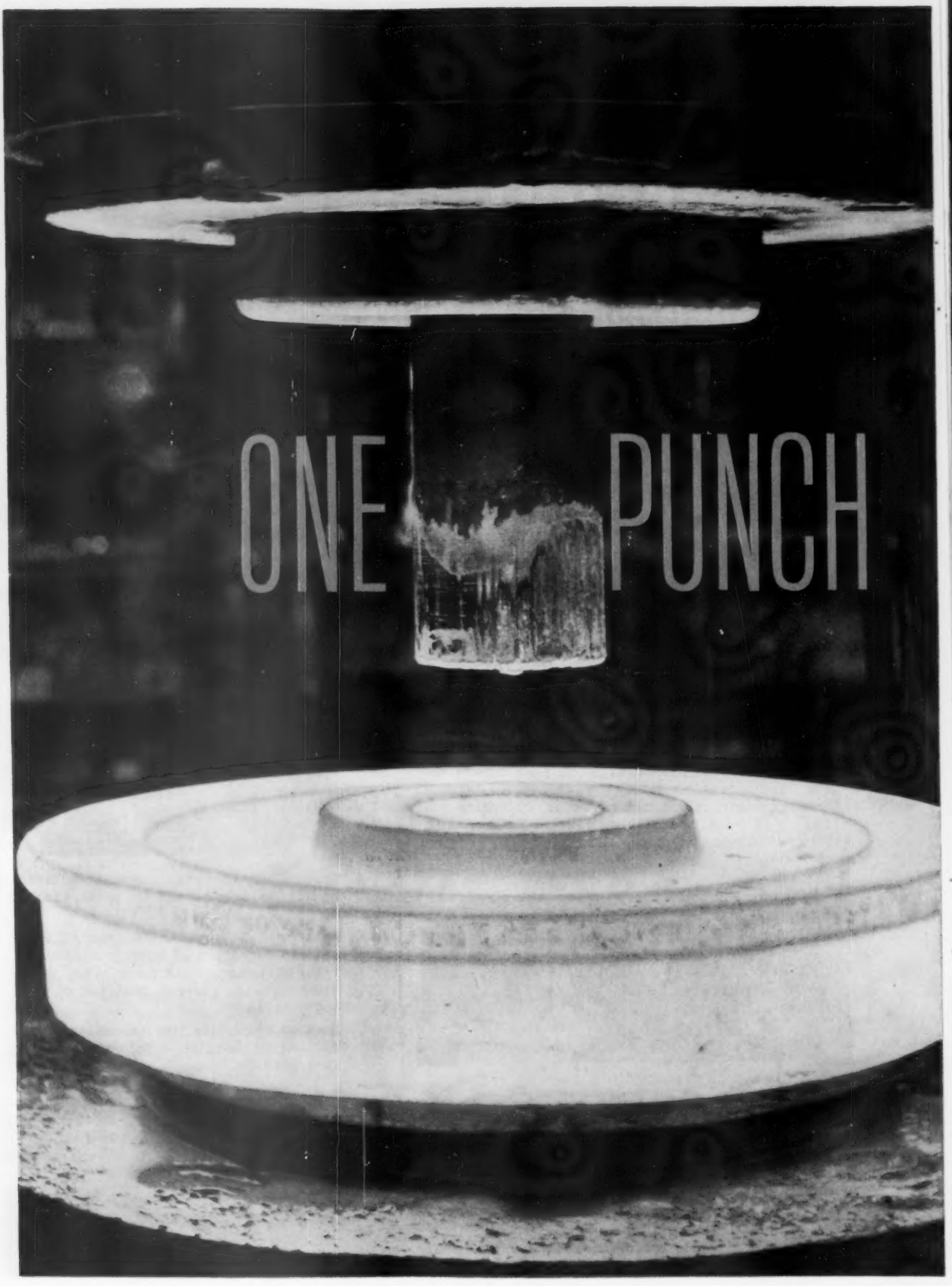
FREE CATALOG: "How to Save Money on Equipment Operation," a booklet full of valuable information, will be sent you on request to Standard Oil Company of California, 225 Bush St., San Francisco, Calif.

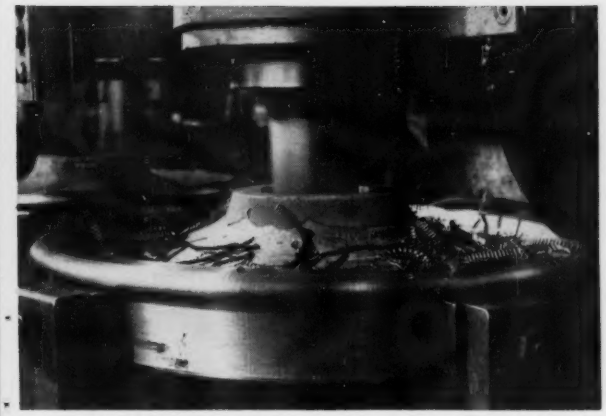
RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado


ONE PUNCH



BORING OF A WHEEL HUB. Hub may be rough bored or finished bored to customer specifications on this modern semi-automatic wheel boring mill.

KNOCKOUT!

ONE POWERFUL THRUST of this giant punch and the center of a wheel hub is literally knocked out—a very important step in the forging of USS *Wrought* Steel Wheels.

During the production of a wheel block, the metal is worked in a direction parallel to the axis of the original ingot—a process which ultimately leaves the zone of ingot segregation in the center of the wheel hub. But the relentless punch press takes care of that—and the unwanted zone of segregation goes clattering into the waste pit.

This rolling process, plus the subsequent rolling operation which works the metal in a direction *transverse* to the axis of the ingot, imparts the best metallurgical properties to the finished wheel. All the careful forging, rolling, and controlled-cooling undergone by a USS *Wrought* Steel Wheel serve to intensify the inherent strength, hardness, and ductility of the steel—resulting in a wheel of remarkable soundness and dependability.

But what does the Wrought Steel Wheel do for you?

IT LASTS LONGER . . . USS One-Wear *Wrought* Steel Wheels will average 200,000 to 300,000 miles or more in normal freight car service.

IT COSTS LESS . . . Its far greater life in any given service will reflect a *substantially lower annual cost* than that of the ordinary wheel, even though, initially, the One-Wear *Wrought* Steel Wheel costs a little more than the ordinary type wheel.

REQUIRES LESS MAINTENANCE . . . Rolling on One-Wear *Wrought* Steel Wheels, a car spends more time *in service* and less time on repair sidings, resulting in increased revenue to the railroad. Also, less frequent repair means reduced maintenance and lower labor costs.

SAVES UNSPRUNG WEIGHT . . . Because they are lighter than ordinary wheels, eight *Wrought* Steel Wheels under a 50-ton capacity car will save approximately 1,520 lbs. of unsprung weight, which can be directly converted into payload capacity—or result in savings due to the decreased load. Furthermore, reduced unsprung weight means less pounding on the track system.

Two strategically located complete wheel shops are ready to fill your orders for *Wrought* Steel Wheels: McKees Rocks (Pittsburgh), Pennsylvania shop, serving the East and Southeast, and the Gary, Indiana shop, supplying the Western and Southern Lines.

USS WROUGHT STEEL WHEELS

UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.

USS

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

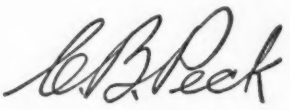
A Dangerous Situation

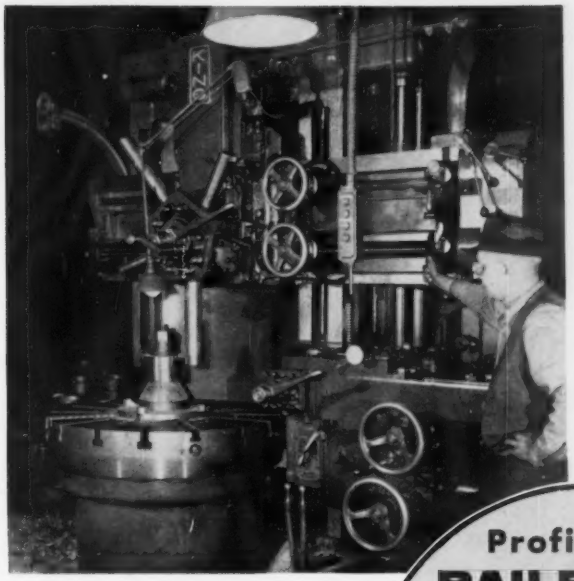
Total freight-car loadings are about 13½ per cent less for the first half of 1954 than during the same period a year ago. During first five months of the year Class I freight-car ownership dropped by nearly 4,600 cars and there were 120,000 fewer serviceable cars. During a considerable period this spring surpluses were running over 130,000 and were not under 100,000 at any time until the middle of June.

At face value, one might conclude that the present situation is one in which additional freight cars are not needed. Notwithstanding the large surpluses being reported, however, shortages have been reported continuously since the first of the year. They have been running between 300 and 600 during most of this period and, since the decline in surpluses in June, are approaching 1,000 cars a day.

When daily shortages were running from 10,000 to 30,000 cars, as they did in 1951 and 1952, the situation involved a definite political hazard to the railways as a whole. Current shortages do not entail this hazard, but whenever a shipper can take to the highway when a railroad fails to supply him with a car, the individual railroad risks not only the loss of revenue from that car, but the loss of a patron who, once he has established connections for highway transport, may never return to the railroad.

Another aspect of the immediate situation is worthy of attention. The prospects are for an increase in car loadings during the remainder of the year. Orders for cars withheld until the need for additional cars is acute don't help. Experience has frequently shown that by the time the cars are delivered, the acute need has passed.



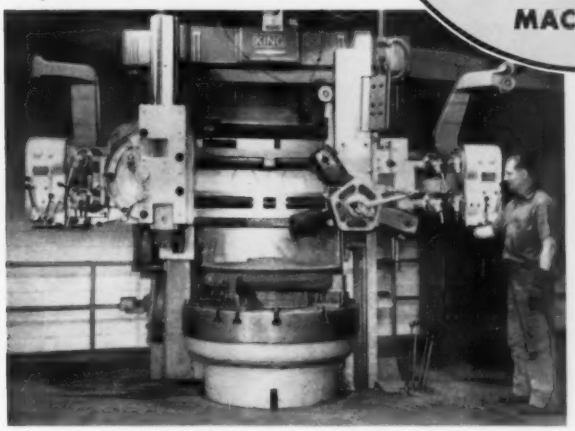


▲ 42″ KING in maintenance shop of a large Eastern railroad. Photo shows locomotive side-rod brass being precision-machined with a carbide tool.

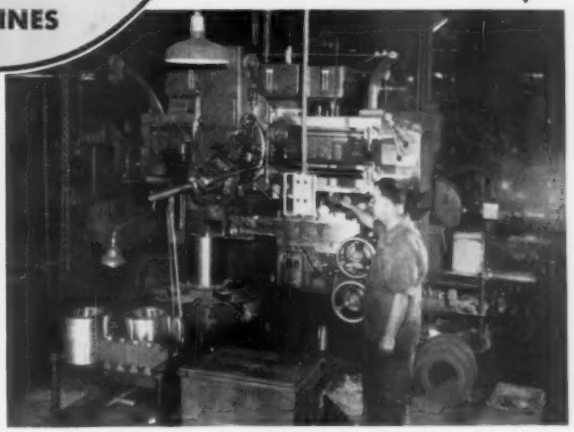
Major Eastern railroad machines ▲ important steam locomotive repair parts on this 42″ KING, shown facing off a multiple bearing crosshead.

Profit-Wise
RAILROADS
Keep Maintenance Costs "Down Under" With
KING
VERTICAL BORING & TURNING MACHINES

In one of America's most modern diesel maintenance shops, this 52″ KING is used for boring, facing, and turning diesel locomotive wheels. ▼



36″ KING machining a brass crank-arm lateral washer. These and other locomotive parts are precision-machined at high speed, minimum cost. ▼



Massive proportions and extra-heavy construction give all KING® machines the rigidity essential for fast work with consistent precision accuracy. A wide range of speeds and feeds, plus simplified controls, make the KING adaptable for all types of boring, turning, and facing work—light or heavy, large or small. KING machines are made in ten sizes—30″, 36″, 42″, 52″, 62″, 72″, 84″, 100″, 120″, and 144″—and in a variety of head combinations, with or without side head. Complete details will be furnished promptly on request. Contact your authorized KING distributor, or write to us direct.

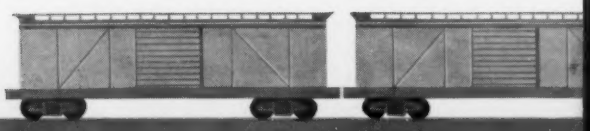
AMERICAN STEEL FOUNDRIES

KING MACHINE TOOL DIVISION

Vertical boring & turning machines . . . 1150 TENNESSEE AVE., CINCINNATI 29, OHIO

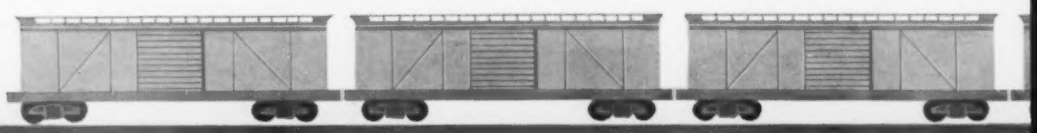
Here's what 17% more Horsepower

MEANS TO YOUR



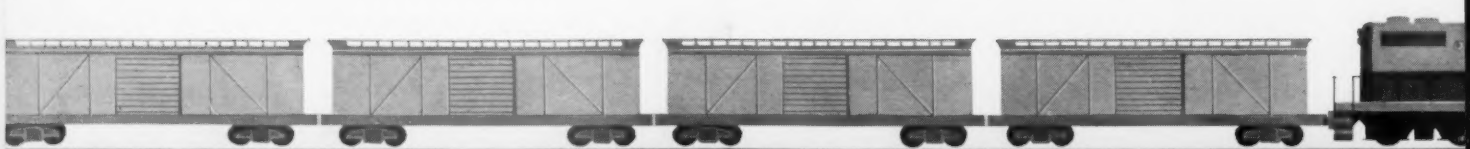
Compared to one 1500-h.p. GP7

1 1750-H.P. GP9 UNIT CAN PULL 3,000 TONS 8%



Compared to two 1500-h.p. GP7's

2 1750-H.P. GP9 UNITS CAN PULL 4,000 TONS 8%



Compared to three 1500-h.p. GP7's

3 1750-H.P. GP9 UNITS CAN PULL 5,000 TONS 8%

YOU CAN earn more in '54—and for years to come—with new General Motors Diesel locomotives.

These great new units have up to 17% more horsepower and increased tractive effort—can haul *more* tons on today's schedules or haul the same loads on *faster* schedules.

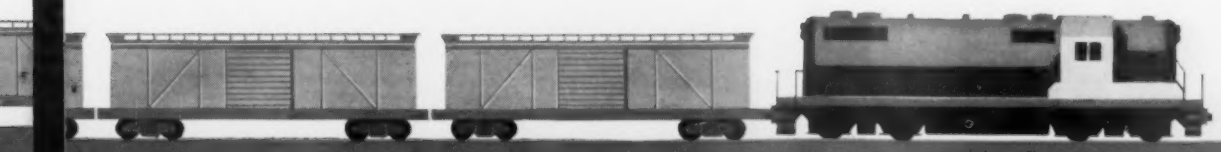
And you can also get this increased performance with your older General Motors locomotives by having Electro-Motive bring them up to the same ratings and performance standards as new models.

For example, your F3 and F7 units can be converted to 1750-h.p. F9 models and returned to you with a full new-locomotive warranty.

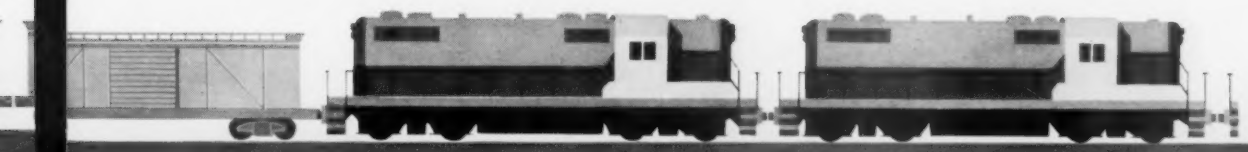
But increased earnings are only part of the story. Improvements in design of major components bring big maintenance savings, too. For full details, call in your Electro-Motive representative or write:

in General Motors Locomotives

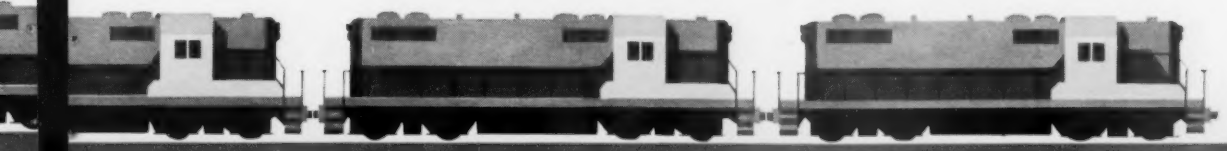
RAILROAD



FASTER OR 450 MORE TONS AT THE SAME SPEED



FASTER OR 600 MORE TONS AT THE SAME SPEED



FASTER OR 750 MORE TONS AT THE SAME SPEED

THE BEST LOCOMOTIVES ARE EVEN BETTER TODAY!

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS LOCOMOTIVES

GENERAL MOTORS La Grange, Illinois • Home of the Diesel Locomotive
In Canada: GENERAL MOTORS DIESEL, LTD., London, Ontario

The Bower-Franklin roller-bearing journal box makes wheel changing easy

With the Bower-Franklin roller bearing and journal box, the complete box and bearing unit can be slipped off the axle without disturbing the inner race. No need to carry spare wheel sets with bearings and boxes already applied.

The straight roller bearings for this freight-car journal box are made by the Bower Roller Bearing Company of Detroit. The inner race fits standard AAR freight-car roller-bearing axles. Two rows of straight rolls are positioned by sturdy retainers. The outer race is contained in a separate, ruggedly-built journal box housing. The bearing permits free lateral movement of the axle up to ½-inch.

Ask us to send you the complete facts on Bower-Franklin journal boxes today.

FRANKLIN BALMAR CORPORATION

WOODBERRY, BALTIMORE 11, MARYLAND

CHICAGO OFFICE: 5001 North Wolcott Ave., Chicago 40

EDITORIALS

A Case of Impaired Health

Sixteen committee reports were reviewed by the General Committee of the AAR Mechanical Division at its two-day meeting in Chicago on June 29 and 30 and the recommendations requiring action by the members accepted for submission to letter ballot. That fact suggests why the organization can cancel an annual meeting and suffer no serious loss in the value or impact of its year's work.

The work done by practically all of the 16 committees, summaries of whose reports are printed in this issue, has an important bearing either on some aspect of the design of details of cars or locomotives, on materials, on standards of maintenance, or on the rules of interchange, all of which affect every railroad. It entails close attention to detail by a group of men on each committee usually large enough to represent practically all the varying interests within the industry. Because the reports must be prepared to face the critical study of the voting members when the recommendations are submitted to letter ballot, few important questions, or even relatively unimportant details, are left to be clarified by discussion at the annual meetings. There are, indeed, some lively discussions and some of them lead to resubmission of recommendations to the committees for further consideration. On the whole, however, the committees take care to anticipate and avoid serious opposition. In a year like this, when no meeting is held and there is no opportunity for advance criticism, the members are able to protect themselves should they be asked to vote on recommendations which they consider ill advised.

Without question, then, the Mechanical Division can survive and its work not suffer seriously when an annual meeting is cancelled. But attendance at these meetings makes it clearly evident that men of responsibility in railway motive power and car departments consider them of value. The contact between the official organization and the membership, which is lost when meetings are not held, is essential for the continued health of the organization.

Monomolecular Film . . .

A young man working alone has made a basic discovery concerning locomotive adhesion. The results of his study supported by subsequent tests on a major railroad indicate that by simple means all rail can be made to approach the equivalent of a dry rail under all conditions of weather and season.

It is well known that under certain conditions of light moisture such as may be caused by fog, dew or light rain, rails may become slippery, whereas with a heavy rain, adhesion between driver and rail may be as good as with a dry rail. The reason for this has not been known, but has now been disclosed by a series of laboratory and rail tests made over a period of three years.

The investigator made many tests and obtained results which were quite inconsistent with each other, a circumstance which would discourage someone less persistent. A chemically clean rail under one test would show good adhesion and in another the adhesion would be poor. An apparently clean rail with poor adhesion, when rubbed vigorously with a dry cloth, would continue to show poor adhesion.

Finally, it was discovered that the slight oiliness from a fingerprint or the holding of a sample by the edges with the fingers would cause a sharp decrease in adhesion. From such a source, it was found that a slippery film, only one molecule thick, and known to science as the monomolecular film, will spread almost instantly over the entire surface of the rail if the rail is moist.

Field tests showed that this film has oxidized oil or grease as its source. Such grease consists largely of journal oil leakage and may be picked up at switch points and crossovers where the outer portion of the wheel tread contacts the surface of the rail. A line of dried grease on the rail, outside the point of wheel contact, is a common condition on curves where the gage exceeds 57 inches. Here the wheels shift toward the high rail, depositing oil on the inner rail. It now appears that under conditions of light moisture, the film will spread from such grease to form the slippery film. A heavy rain will remove it, and experiments are now being conducted with various types of detergents applied in several ways to eliminate the film. Such procedure could do much to improve locomotive performance and reduce the use of sand.

More information on this subject will appear in subsequent issues of *Railway Locomotives and Cars.*

New Books

SYMPOSIUM ON DIESEL LOCOMOTIVE ENGINE MAINTENANCE. This booklet presents most of the papers read at the third annual symposium sponsored by the American Locomotive Company and held May 11 and 12, 1953, in Schenectady. Both of the preceding annual symposia concentrated on application of the spectrograph in conjunction with diesel locomotive engine maintenance. It was felt, in planning this meeting, that the general subject of spectroscopy had been quite completely discussed at previous meetings, and that only a single session should be devoted to covering the latest developments in this field. The remainder of the time was devoted to other subjects dealing with diesel locomotive operation and maintenance. Papers were presented on railroad lubricating oils, diesel engine crankcase oils, the electron microscope, air filtration, and diesel engine cooling water treatment.

American Locomotive Company, Public Relations Department, Schenectady 5, New York. Price Free.

Balance

makes **TRAIN MASTER**

your soundest motive power investment

Railroading in itself is a system of balancing the requirements of transportation against the cost of doing the job efficiently . . . economically.

The Fairbanks-Morse Train Master is the first locomotive to fit so completely that industry pattern of balance . . . efficiency . . . economy. For Train Master has the power and versatility that can successfully balance your locomotive mileage for greater operation efficiency. Fairbanks, Morse & Co., Chicago 5, Illinois.

BALANCED DESIGN

TM design stresses balanced placement of components for easy accessibility . . . compactness. You'll find, too, that operating supplies are located near truck centers or other points of low frame deflection for superior weight distribution. Operating supply capacities on the Train Master are higher than on any other motive power unit. This extends the utility and range of TM and also assures greater dependability.

BALANCED OPERATIONS

An unsurpassed record of operation is now being established the country over by the more than 150,000 horsepower of Train Masters in railroad ownership. TM has proved that it can equal—and surpass—the performance of the power it replaces, and protect all other assignments as well. It is the ability to handle any job efficiently that makes the Train Master the most useful diesel locomotive ever built.

BALANCED MAINTENANCE

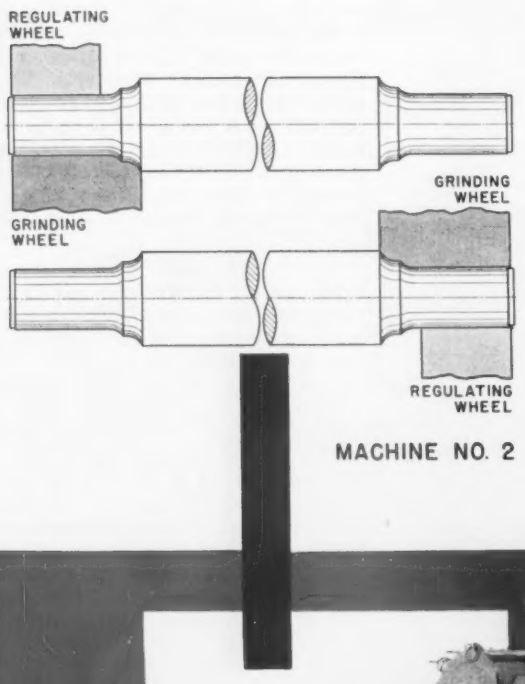
From roof to rail, the Train Master is the easiest and most economical locomotive to maintain. Check the maintenance record of the Train Master power plant—the famous Opposed-Piston engine. The 2400-horsepower O-P—over a four year period—has established a parts cost record of less than one cent a mile in railroad service. Conservatively rated at 200 horsepower per cylinder, the O-P engine has not been rerated since it first entered railroad service. Notice maximum accessibility of components. Truck assembly, for example... springs and snubbers outboard for easy inspection . . . brake shoes that you can see, touch and change at ground level.

FAIRBANKS-MORSE

a name worth remembering when you want the best

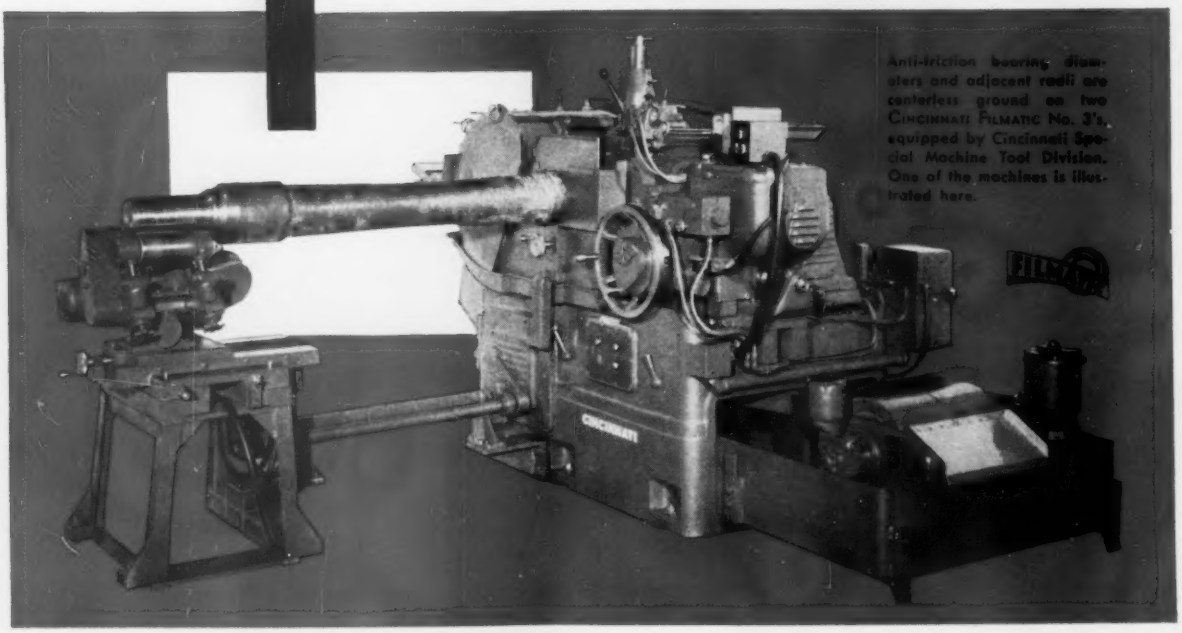
DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS AND RAILROAD EQUIPMENT • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • HAMMER MILLS • MAGNETOS

Production Line For Axles
Incorporates Two Cincinnati Filmatic Centerless Grinding Machines



It's a big job to produce 90 half-ton car wheel axles per 8-hour shift. One railway equipment manufacturer does it by employing many of the latest automation techniques. Two CINCINNATI FILMATIC No. 3 Centerless Grinders are included in the automated production line. The first machine grinds the anti-friction bearing diameter, dust collar diameter, and adjacent radii in one operation, at one end of the axle. The axle rolls over an elevated "highway" to the second machine, where the corresponding bearing diameters and adjacent radii are ground. ¶ Two interesting innovations are incorporated in this CINCINNATI Centerless equipment. 1) A variable speed power driven outboard roller support serves as a helper drive to rotate the axle. Lateral movement of a cross slide on this support is synchronized with the infeed movement of the machine's regulating wheel slide. 2) A continuous caliper type gage insures size control during grinding, to an accuracy of less than half the allowable tolerance. ¶ CINCINNATI No. 3 Centerless Grinding Machines, with their exclusive FILMATIC bearing spindle mounting, are head and shoulders above any other precision grinder for handling work of this type. Catalog No. G-570-3 gives you a few reasons why. Write for a copy, or look in Sweet's Machine Tool Catalog for brief specifications.

CINCINNATI GRINDERS INCORPORATED
Subsidiary of The Cincinnati Milling Machine Co.
CINCINNATI 9, OHIO


Anti-friction bearing diameters and adjacent radii are centerless ground on two CINCINNATI FILMATIC No. 3's, equipped by Cincinnati Special Machine Tool Division. One of the machines is illustrated here.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

RAILWAY LOCOMOTIVES AND CARS

"Jawn Henry"

The new steam-turbine-electric unit now being tested on the N&W may be the answer to the threat of oil fuel

THE TITLE of this story may seem somewhat of a departure from the traditional style of a technical paper but that's the name the folks down in Norfolk and Western territory have given to the newest and largest single-unit locomotive yet to be built—the steam-turbine-electric No. 2,300. "Jawn Henry"—the legendary railroad Hercules whose power moved mountains—is the result of almost five years of planning on the part of the N&W's engineering staff; Baldwin-Lima-Hamilton, who built the locomotive; Westinghouse Electric and Babcock-Wilcox. The latter two were responsible for the design and building of the steam turbine power plant and electrical equipment and the completely new type of high-pressure steam generating equipment from whence the 2,300's sixty-mile speed and 4,500 hp come.

This new locomotive has a maximum rated tractive force of 175,000 lb and continuous rating 144,000 lb (at 9 mph) and weighs, loaded with 20 tons of coal and 22,000 gal. of water, 586 tons, or 1,172,000 lb. Behind this new design of motive power was the ob-

The fireman's side of the cab showing the controls for boiler and stoker. The operator's hand is on the bell ringer valve.

jective of a powerful, coal burning locomotive with the flexibility of the electric drive, a thermal efficiency high enough to give a lower fuel cost than other forms of railroad motive power and, to quote the N&W Magazine, "It may be the N&W's answer to the threat of oil as transportation fuel. Present road tests will tell."

No. 2300 has, during the past month, been undergoing shakedown tests in freight service between Roanoke, Va. and Bluefield, W. Va. having run a total of 5500 miles. The official tests were to start during the week of July 19 at the conclusion of which the N&W will evaluate the performance results with a view to formal acceptance at some later date. No performance data are available at this time.

The design includes the combination of several features which, while proven satisfactory in Navy and stationary practice, are new to the locomotive field; and they have been incorporated for the first time in locomotive practice in this unit. For example, the use of steam at high pressure and high temperature (600 psi, 900 deg F), in a geared turbine unit developing 4,500 hp at the electric generator supplying power for the traction motors, contributes to the high thermal efficiency.

The diagram, the photos and the table accompanying the diagram give the high spots of the design. The locomotive is a single unit 111 ft 7½ in. long plus a 49-ft 6-in. tender which carries the water (the fuel is carried at the head end of the power unit). The 6-6-6-6-wheel arrangement is made up of two swivel-type trucks at each end of the locomotive spanned by a bolster. These latter are loaded by body center pins and by spring-plunger loading pads at each corner.

The front-span bolster carries the cast-steel pilot and swing-type coupler. Traction and buffing loads are carried through the body center pin to the side trusses and to the rear center pin. The rear span bolster carries M-380 rubber draft gear and a Tightlock coupler, also the cold and emergency feedwater pumps.

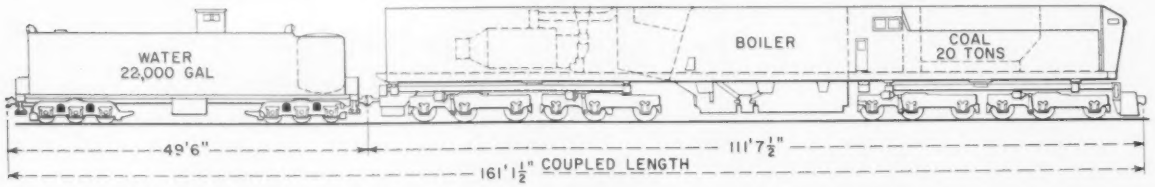
The locomotive, from front to back includes: (1) Electric control and dynamic braking equipment (for forward trucks), (2) coal bunker and stoker, (3) operator's cab, (4) boiler, (5) turbine and boiler-feed equipment, (6) generator, and (7) electric control and dynamic braking equipment (for rear trucks).

Sand boxes are located beside the coal bunker, ahead of the operator's cab, in the turbine and generator compartments. Each truck is sanded front and back. Sandboxes are filled from the top.

Water Tube Boiler

The Babcock & Wilcox water tube boiler is a construction that eliminates water legs and staybolts. These, in the conventional steam locomotive not only limited the possible steam pressure but caused high cost of maintenance and plenty of out-of-service time. The weight and space occupied by this boiler is considerably less than for the older fire tube type.

Coal is fired by a conventional locomotive type stoker. The grate is the self-cleaning traveling type. This feature is a most important improvement over previous practice as it prevents the accumulation of ash and clinkers which



CHARACTERISTICS OF THE N&W EXPERIMENTAL COAL-FIRED STEAM TURBINE ELECTRIC FREIGHT LOCOMOTIVE

Wheel arrangement	6-6-6-6
Road number	2300
Rated horsepower at turbine shaft	4,500
Starting tractive force, lb.	175,000
Rated continuous tractive force (9 mph), lb.	144,000
Rated maximum speed, mph	60
Wheel base, ft-in.:	
Rigid	13-0
Total engine	96-5½
Total engine and tender	1-47-3½
Driving wheels, diameter, in.	42
Length, ft-in.:	
Over couplers	111-7½
Tender over couplers	49-6
Locomotive and tender over couplers	161-1½
Weights, lb:	
On drivers	807,000
Tender, loaded, lb.	365,000
Tender, empty, lb.	180,800
Locomotive and tender, lb.	1,172,000
Boiler, water tube type	B&W, natural circulation
Steam pressure, psi	600
Steam temperature, deg. F	900
Stoker	Standard Type BK
Coal capacity, tons	20
Water capacity, tender, gal.	22,000
Turbine, generator, motors	Westinghouse
Roller bearings:	
Locomotive trucks	Timken
Tender trucks	SKF

interfere greatly with the uniformity of the fuel bed, so necessary for prevention of smoke and for efficient combustion. The area of the grate and the smaller amount of coal required operate to reduce the rate of combustion per square foot of grate area and cinder discharge from the stack, with a corresponding improvement in efficiency.

The air for combustion is supplied under pressure by steam-turbine-driven axial blower through an air preheater, both of which are new features in locomotive practice. By these means the flue gas temperature is reduced and the efficiency increased. This method of supplying combustion air eliminates the exhaust nozzle and the resulting inefficiency of back pressure on the main steam turbine. Most previously designed steam turbine locomotives, as well as the conventional reciprocating steam locomotives, have been adversely affected by high back pressure caused by the exhaust nozzle.

Boiler Feedwater System

Water is pumped from the tender by a cold water pump through a Zeolite softener located on the tender, then through the turbine oil cooler and into an open type deaerating feedwater heater. From here a booster pump delivers the softened, deaerated and heated water to the main feed pump, which delivers it through an economizer (for additional heating) to the boiler drum. An automatic feed supplies sodium sulfite in proportion to water flow. A continuous boiler blow-down maintains proper boiler water concentration. The high pressure emergency pump can deliver cold water from the tender directly to the boiler drum if required.

Boiler Controls

Another outstanding feature is the completely automatic control of fuel and air to the furnace as well as the feedwater to the boiler in exact proportion to the demand for steam. The turbine governor maintains turbine speed by supplying more or less steam flow as required. The automatic control responds instantly to maintain boiler pressure by changing the coal supply and proportioning the air flow to the steam flow; also, the boiler feedwater supply to keep the correct water level in the boiler drum. The automation of the complete unit keeps the proper relation between coal and air for the best combustion efficiency, and also prevents loss of steam and nuisance from the popping of safety valves.

The Westinghouse power plant consists of an impulse type non-condensing steam turbine which delivers 4,500 hp at 8,000 rpm to the generator for traction. The turbine drives the generator through an 8.9 to 1 ratio single-helical reduction gear. The generator has two armatures on a single shaft, each of which is electrically connected to two parallel groups of three, series-connected traction motors (one motor on each axle).

All manual controls are located in the engineman's compartment. The master controller is equipped with a throttle and reverse lever, the throttle having 12 notches in addition to the OFF and IDLE positions. It actuates the turbine speed changer pneumatically and also controls the excitation of the main generators. Power and braking are applied smoothly, without transition. The reverse lever has five positions: BRAKE, FORWARD, OFF, REVERSE, and BRAKE.

A flexible shaft with a handwheel in the operator's cab provides a means for opening and closing the turbine stop valve.

A push-pull type trip lever, with the handle in the operator's cab can be used to shut down the turbine in an emergency.

The cab its equipment are supported by two side trusses, with liberal crossties for box strength. The side truss with no cab underframe construction was dictated by the fact that the boiler takes up the entire locomotive cross-section between the side trusses for a length of 34 ft. The boiler is 102½ in. wide with its roof sheet conforming to and forming the cab roof over the boiler. The ash pan clears the rail by only eight in.

The operating brake (Schedule 24RL) is located under the operator's cab, with the air pumps and reservoirs under the coal-bunker side slope sheets. Axial-flow traction motor blowers are located in the electrical compartments, each blower supplying air to six traction motors.

Fans for ventilating the dynamic braking resistors are driven by motors connected across the resistors. The braking effort varies from 35,000 lb at 50 mph to 130,000 lb at 14 mph.

Among the old and established features are included the steam-driven air compressors and the whistle. The trucks, including the Westinghouse type 370-DZ traction motors, are standard for diesel locomotives. The main turbine, generators, turbine driven combustion air blower, and electrical control are all adapted from existing practice in railroad, marine and other power fields. In general, the new locomotive has all the desirable characteristics inherent in electric drive units such as (1) high starting tractive force, and (2) no reciprocating parts, plus the advantage of being able to use coal.

Baldwin-Lima-Hamilton, designer and builder of running gear, cab, tender, and other mechanical parts, was also responsible for the erection and assembly in the locomotive of all component parts including the Westinghouse steam turbine, generator, traction motors, forced draft blower, and electrical control equipment, and the Babcock & Wilcox Company's high pressure boiler. The Bailey Meter Co. installed the boiler controls.

The engineman's station in the cab, which is weather-proof and finished with heat resistant stippled blue-green and gray paint.

1. First step in upgrading this box car is to outline all openings—real or potential—with chalk.

2. Chalk also openings around bolts or rivets which might leak grain as the sides "work" when the car is in transit.

3. Joints between the wall and the floor or ceiling can be sealed tight against moisture or infestation.

A Cheaper Way to

AN ADAPTATION of the process used by the government to preserve ships, planes and defense equipment has enabled the Rock Island to make grain cars out of rough box cars at a cost averaging only $20 compared with $75 to $125 under the previous method of replacing the lining and other time-consuming operations. Two men do in a few hours at the Armourdale Yard in Kansas City, Kan., what formerly took several days. The sprayed-on material dries hard enough to resist the action of scoop shovels and mechanical grain loaders, and the car can be loaded within an hour after the spraying has been completed.

While the process—known as "cocooning"—is still in the experimental stage, the Rock Island is enthusiastic about its future possibilities and foresees savings of hundreds of thousands of dollars a year if widely adopted. So far only a few dozen cars have been upgraded for grain, but in each instance the car was deliberately chosen from among the worst of the rough cars available. Results, none the less, have been uniformly satisfactory with no grain lost on any car that could be attributed to failure of the cocoon process.

The new procedure employs two materials—fiber glass screening and a tough plastic cement about the consistency of paint. A few steps complete the operation:

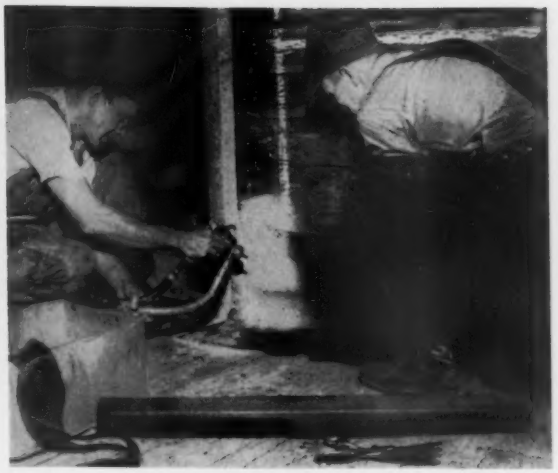
(1) Circle with chalk all holes and openings, actual or potential.

(2) Apply a thin coat of the cement around floor and wall openings with an ordinary high-pressure paint sprayer.

(3) Cut and stick over this initial thin plastic coat small sections of fiber glass screening (small sections are sprayed at a time so that the plastic does not harden before the screening is pasted on).

(4) Spray on the final, and thicker, coat, which is held in place by the screening until it dries.

4. Small pre-cut lengths of fiber glass screen are stuck over the markings by spraying on a thin coat of the plastic.



5. This screening holds the final and thicker coat of the spray in place while it dries.

Upgrade Box Cars

Rock Island employs new method to apply plastic sprayed-on cement to make rough cars grain-tight in a few hours

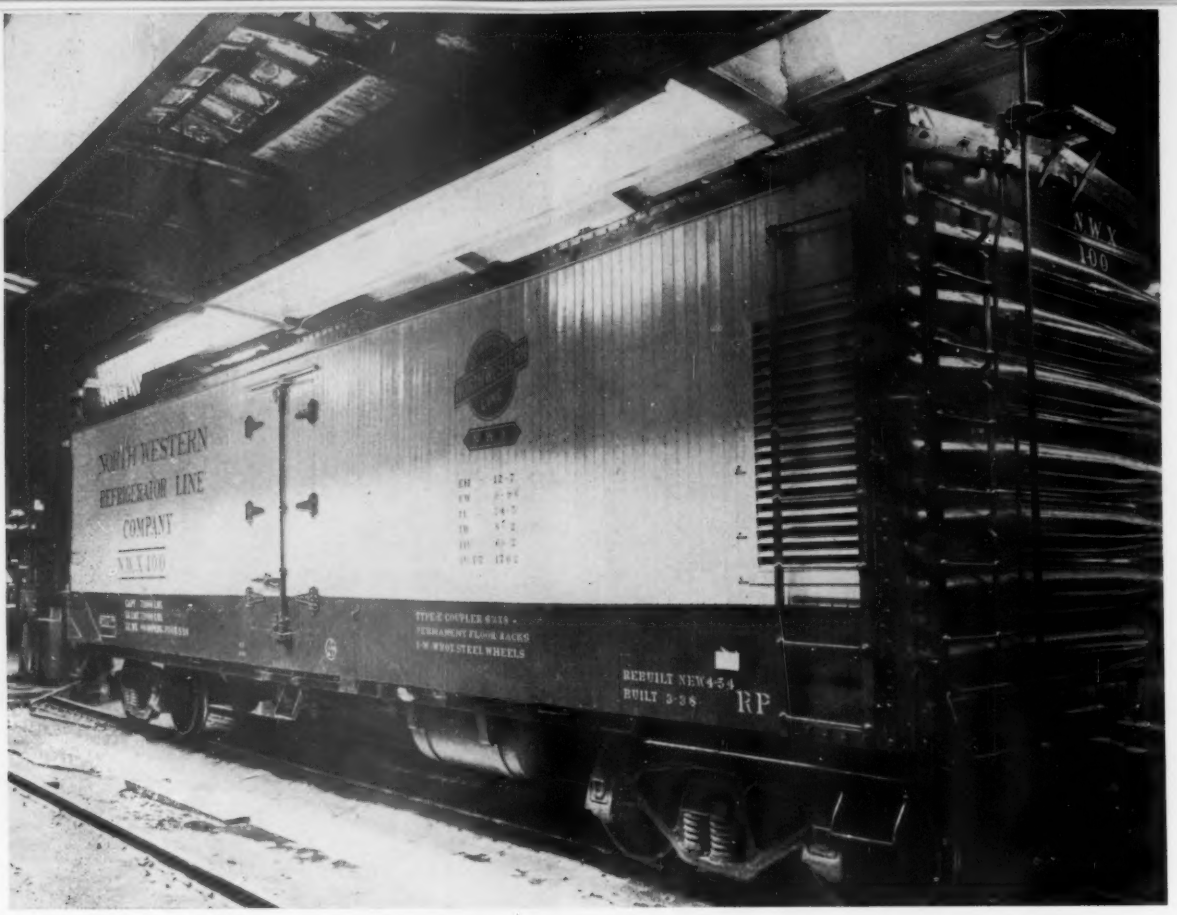
6. The material dries hard and quickly, permitting the car to be loaded within an hour after spraying is completed.

The procedure is also being tried out on cars for hauling carbon black, for which a top grade car cannot normally be afforded because a trip with carbon black would render it unsuitable for general usage. As the carbon black is in sacks, the principal problem is not leakage but sharp projections which tear the sacks. Cocooning is used to lick this problem in a slightly different way. Slivers and other sharp projections are first removed, after which the floors and the entire inside surface of the walls and ends are sprayed to a height of about five feet. This gives a smooth and continuous surface, filling in all cracks, gouges and holes in the wood where the bags might come in contact and be torn.

The idea for cocooning the insides of freight cars for upgrading them was developed by Rock Island mechanical officers after witnessing the moth-balling of some army locomotives for storage with the plastic spray. The material used in this process is furnished by the R. M. Hollingshead Corp., Camden, N. J.

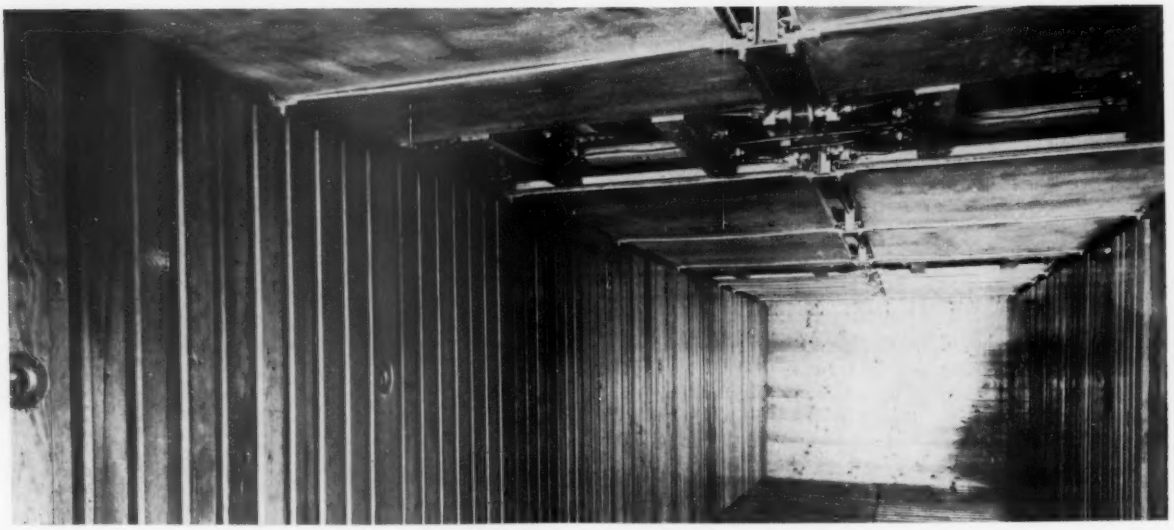
While service experience with the sprayed cars is limited, the railroad believes that the quickly-made repairs will be good for several years, and that loss and damage claims on grain will be reduced. On the average, a barrel of the material will upgrade 40 to 50 cars at a material cost of $5 to $10 per car.

7. On carbon black cars, slivers and other sharp projections are removed and the entire inside sprayed 5 ft high.



The North Western refrigerator as it was completed in the shop.

This C&NW Reefer Has



Large reservoir of frozen solution in holdover plates will keep the car cold for long period if refrigeration fails.

New Type Mechanical Refrigeration

System with no rotating electrical equipment has frozen solution to keep car cold if power plant fails

Outstanding Features:

- **Driving the compressor through belts by the engine permits elimination of all electrical intermediaries.**
- **The power plant fits in one end bunker, increases cargo space 10%, and is readily removable as a unit.**
- **Large reservoir of frozen solution in holdover plates will keep the car cold for long period if refrigeration fails.**
- **The combination of the sloping cold plates and the spacing in the sides assure natural air circulation.**

A NEW-TYPE MECHANICAL REFRIGERATION system which eliminates all electrical generating and driving equipment and most electrically-operated control devices has been applied to what was formerly a conventional end-bunker-type ice-refrigerated car. The car, originally built in 1938 for the C&NW, has been converted by the North American Car Corporation using a refrigeration system by Saylor-Beall Company of St. Johns, Mich., a diesel engine by Fairbanks-Morse and interior car cooling apparatus by the Dole Refrigerating Company, 5910 North Pulaski Road, Chicago.

The diesel engine drives the condensor fans and the compressor directly through belts, eliminating the conventional intermediate generator and motors. The engine and condensing unit are installed in the space formerly occupied by one ice bunker, releasing the other ice bunker for lading and increasing cargo space approximately 10 per cent.

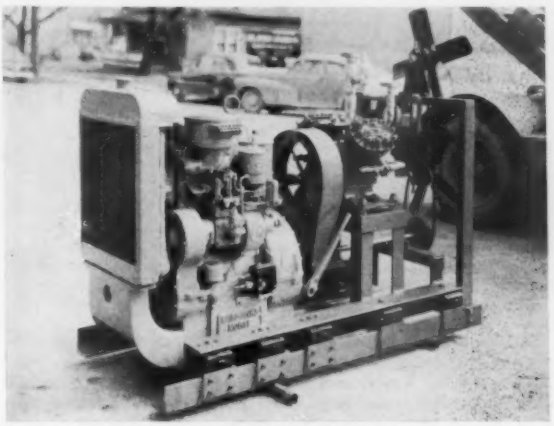
Protection of the lading in the event of any failure of the refrigeration system, is attained through "Holdover" cold plates. Six of these, each 46 in. by 120 in., are located in the ceiling space formerly required for air circulation. Each contains a gas and a solution. The gas (Freon) is the refrigerant, and it circulates through the holdover plates in ¾-in. square tubes (see sketch).

The solution exists in much greater volume, occupying all the space within the plate between the tubes. This holdover solution freezes at minus 12 degrees and is in a normally frozen state when the refrigeration system is operating. There is thus a large reservoir of heat absorption available in the heat of fusion to melt this large mass of frozen solution. This is what will keep the car interior cold for long periods of time in the event of power plant failure. It is estimated that this reservoir of heat absorption will maintain the temperature within the car for a period of from 8 to 24 hours, depending on outside conditions, and that the temperature rise would be about 1 deg. F. per hour, or small enough that the cargo would not spoil before the failure were discovered and corrected.

The usual fin type evaporator is replaced by six holdover cold plates which are controlled by an individual expansion valve in each plate. The expansion valve drops the pressure, and consequently the temperature of the Freon gas within the holdover plates, cooling the car and keeping the solution frozen.

No Auxiliary Air Circulation

The holdover cold plates are placed in the top of the car at a slight angle to the horizontal. This causes a natu-



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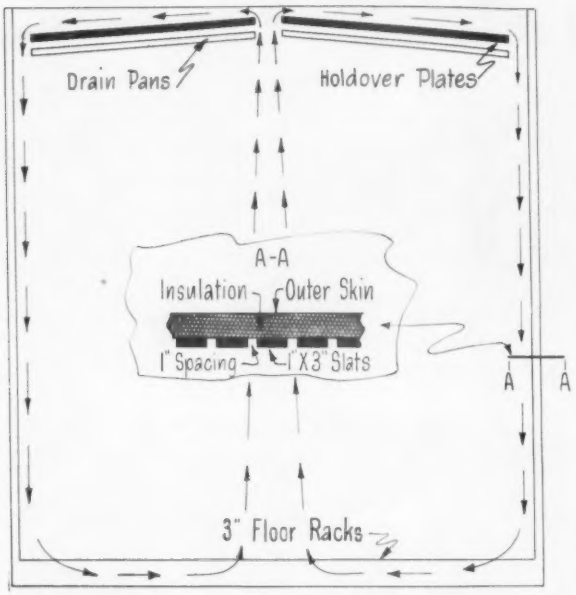


NATURAL AIR CIRCULATION—How it is attained—As air gets colder it gets heavier, and the cold air flows downward (thus outward) across the top surface of the sloping holdover cold plates. This motion continues with the cold air flowing downward along each side of the car on under the floor racks and across toward the center —where, aided by the tendency of warm air to rise—the circular path is completed.

The inside of the car is constructed to eliminate interference with this circulation regardless of how the car is loaded. The sides of the car have 1 in. by 3 in. lumber spaced one inch apart—thus regardless of how tight the lading is packed against the side, circulation can occur through the 1-in. spacing. Similar spacing of boards assures circulation through the floor rack.

ral circular flow of air as shown in the sketch, and it eliminates the need for auxiliary air circulating equipment.

The temperature within the car can be controlled automatically anywhere from outdoor temperature down to 15 deg. below zero. The car does not have automatic heat, although this is contemplated for future development. Any heating required in the present car would have to be by auxiliary method.

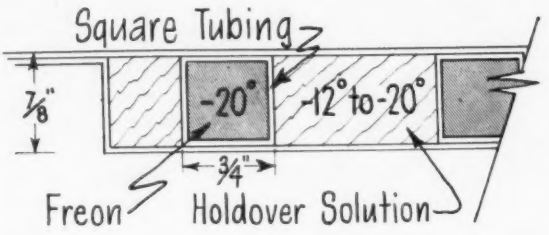
Temperature control within the car is governed by a by-pass valve between the compressor freon discharge and return line. When this valve is all the way closed, the system will go down to about —25 degrees. The number of turns that the valve is opened raises the temperature setting to that desired. Essentially, the control system boils down to this: The compressor has a fixed capacity, and runs continually. The percentage of this capacity used determines the temperature of the car; the percentage not used is by-passed by the control valve.

The Fairbanks-Morse diesel engine is rated at 16 hp at 1200 rpm. It runs continuously at that speed with the amount of cooling required from the system governed by varying the load on the engine through the by-pass between the compressor outlet and inlet gas. A small storage battery is incorporated with the engine-compressor unit for starting the engine. Fuel consumption at full load is 0.7 gal per hr. The tank, located under the car, holds 225 gallons, or enough for some 300 hours full load operation.

Conversion and Servicing

The principal modification to existing cars required for the installation of this refrigerating equipment is to incorporate an air intake for condensor cooling and for exhaust outlet in the access door through which the compartment is entered for servicing. Additional insulation may be required also if the car is to be operated at much lower temperatures than originally designed for.

The entire condensing unit can be removed from the compartment by removing eight bolts, and disconnecting refrigeration and fuel lines and battery cables. The time required for this operation is short enough that it can be used for regularly scheduled maintenance as well as to minimize out of service time from a failure that requires substituting a different power unit.



HOW THE HOLDOVER PLATES WORK—The Freon (in the square tubes within the holdover plate) will normally be at some temperature 5 or 10 degrees lower than the minus 12 that the surrounding solution melts or freezes at, perhaps minus 20 degrees. The direct contact between the square tubes and the top and bottom surfaces of the cold plates will produce a temperature close to —20 over these surfaces. This will provide a temperature in the vicinity of 5 or 10 below within the car. Eventually, after the system has been in operation long enough, the frozen solution (which keeps the car cold in the event of a power plant failure) will get down to about —20 also.

Should this system be used on a car carrying commodities to be kept within a higher temperature range, a different holdover solution would be required. If the car were to be kept at 32 deg., a solution that froze at about 26 deg. would be used. The solution that freezes at —12 could not be used because, if it were kept frozen, the car interior would go down to zero or below—and, if it were kept around 20-26 deg., it would not be in the frozen state and not therefore have the heat absorption capacity to protect the cargo in the event of a power plant failure.

The system could be applied to a car that would operate at several different temperature ranges. In this case some of the holdover plates would contain solutions that froze at very low temperatures, and others that froze at higher temperatures. For example, if three plates contained 26-deg. holdover solution and three contained —12-deg. solution, the car could be used for either —5 or +32-deg. commodities. However, the gain in versatility would be at the expense of reducing the holdover protection at both temperatures. The large heat absorption ability (106 Btu per lb) to melt one of the solutions would only be available in the range of its freezing temperature. Therefore, only half as much solution, and hence holdover capacity, would be available at either of the two temperatures as is available in the present car set for the on temperature range (roughly zero to 15 below).

Great Northern Cars Painted in 12 Minutes

An automatic traveling spray booth is being used for the first time in spray painting freight cars at the Great Northern car shops, St. Cloud, Minn. The spray booth operates somewhat like earlier models used in painting passenger cars, but with the important difference that hand spraying is replaced by automatic transverse coating machines on the sides and a gang arrangement of automatic spray guns on top of the unit.

At the St. Cloud shops, four freight cars are placed in line on the painting track inside the shop and the booth moves on rails past the cars, under push-button control. Each car receives two coats of paint on both sides and one on the roof. The ends of the cars are hand sprayed by workmen using extension spray guns. These workmen, who ride inside the traveling booth, stop at each spot where car ends are sprayed. The complete cycle takes 48 min., or 12 min. per car for a single coat.

This method of painting freight cars is said to produce excellent results from the standpoint of car appearance, providing a uniform dependable coating and conserving labor. Another factor of importance is the economical use of material which costs from three to four dollars a gallon. With each car requiring from six to seven gallons of coating material, the waste factor has been given special study in this particular installation to reduce it to a minimum.

The new automatic traveling booth has controls within easy reach of the operator and is equipped with inside platforms which can be raised or lowered to enable the operator to spray the ends of the cars efficiently. The booth, a self-contained painting unit, is equipped with its own compressors, pressure regulator and filter for spray-gun air, and a circulating system with capacity up to 110 gal. of paint. In addition there are many safety factors including a CO-2 system.

It is reported that with ordinary spray methods it takes two men 30 min. to apply one coat whereas with the traveling booth a more thorough job is done in about 12 min. The traveling booth eliminates the need for exhausting large volumes of air from the building along with the high cost of heating comparable volumes of outdoor replacement air. This equipment was installed by the DeVilbiss Company, Toledo, O.

DeVilbiss automatic traveling spray booth used in painting freight cars at the GN shops, St. Cloud, Minn.

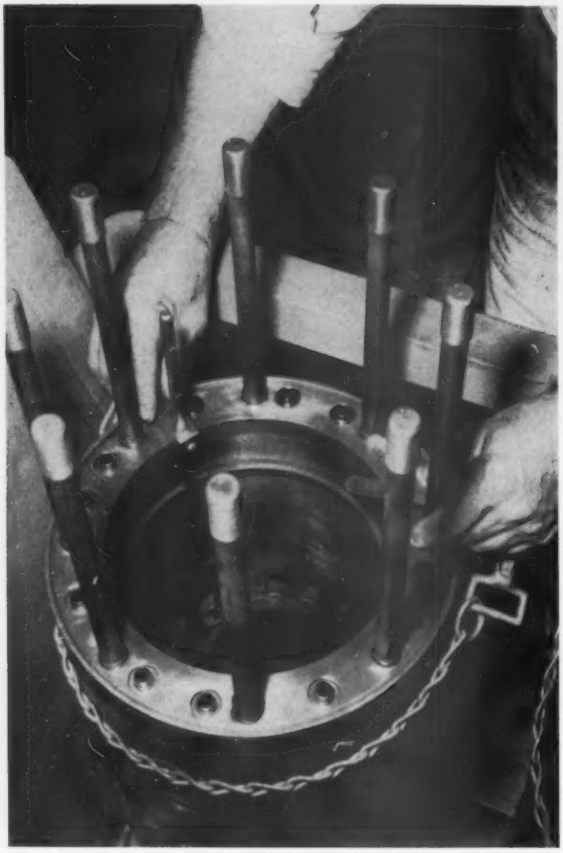
Jack Attachment for Lifting Axles with Pulleys

The St. Louis-San Francisco has built an attachment for the drop-pit jack at the Kansas City coach yard which permits lowering a passenger car axle with the generator pulley in place. The attachment is of sufficient depth and width to fit around and clear the generator pulley for dropping a mounted passenger car wheel set.

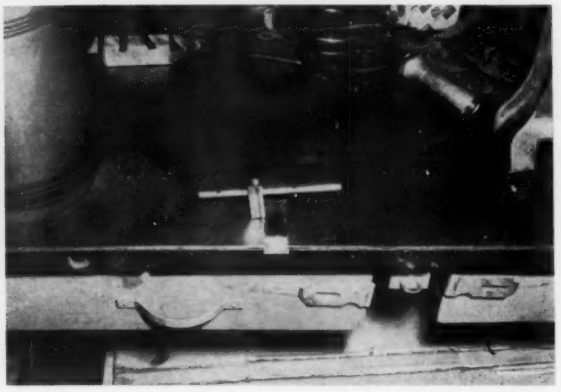
The jack attachment was built primarily to simplify the dropping of pulley-equipped wheel sets to avoid having to work on the generator pulley underneath the car. With the new attachment the wheel set can be dropped easily and the work done out in the open.

Attachment for drop pit jack to lower pulley-equipped wheels so that pulley work can be done in the open.

Ideas for the Diesel Repair Man...



How the Wabash squares rings belows the tapered part of the liner to check for proper gap.



The checking device, showing the two notches which set commonly used distances to the true diameter.

SQUARE RINGS TO CHECK GAP—A western railroad uses a device to square the rings in diesel cylinders accurately while checking for proper gap. The device consists of a ¾-in. square steel block drilled and reamed to permit a ⅜-in. drill rod to slide back and forth. The drill rod is secured at any spot by a ¼-in. bolt.

In operation, the square block rests along the top of the cylinder with the drill rod extended and secured at a length sufficient to extend beyond the tapered portion of the liner down to a section with a true diameter. A ring is slipped in the liner and the block and drill rod push it down the same distance (whatever is set on the rod) from the top of the cylinder all around.

The ring gap checker can be used on all diesel engines. Two notches set the drill rod at the two most commonly used distances to the true diameter section.

Small air motor equipped with guides and rotary file for putting fillet on GM air intake ports.

FILLET ON LINER PORTS—A small air motor at the Wabash Decatur Diesel Shop has been equipped with a rotary file and a guide for putting the fillet on the air intake ports of Electro-Motive diesel engines. The guide is a pair of round rockers of the same radius as liner.

With the guide the rotary file can be run either axially or circumferentially. In putting the fillets on the port, the normal process is to run around the four sides of the port in succession.

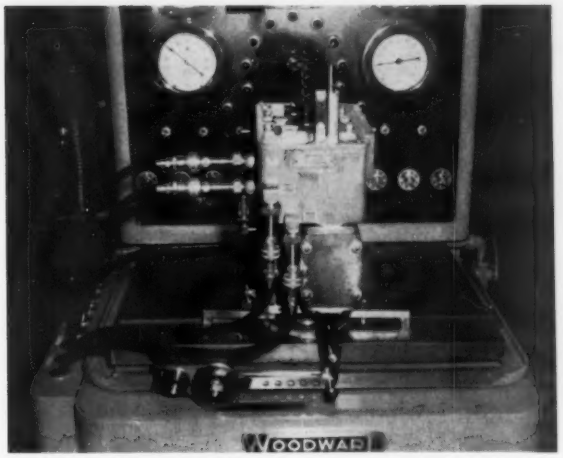
LINER ASSEMBLY CONTAINER—The Wabash ships diesel cylinder liner assemblies from its main Decatur diesel back shop to outlying points in a container made of 16-gage steel. The container in general serves to hold the power assembly snugly in much the same manner that portable racks do for transporting about the shop.

The four liners are set in place against a bracket extending the length of the container with four semi-circular sections against which the liners rest. These are clamped in place by a piece of strap iron, also running the greater part of the length of the container, and with

Shipping container in which power assemblies are held by belt-lined rings.

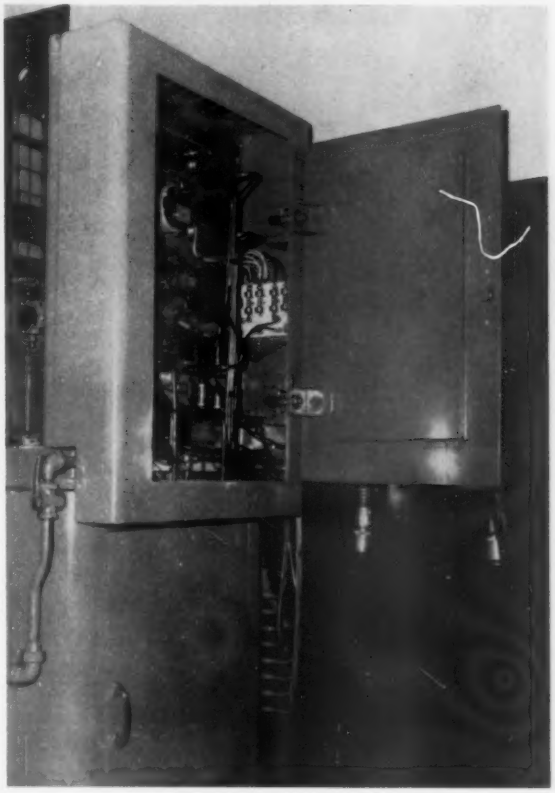
four semi-circular sections, which bolt against the first length. Both of these sections are lined with belting to avoid scratching the liner. The assemblies are secured in place by tight sleeves which fit over two of the studs.

The main frame members of the container are two 5-in. channels on the bottom, which are tied together by angle iron. The wooden liner supports are attached to the channels and angle iron by carriage bolts.



Coupling governor for test takes seconds rather than minutes by adding quick-disconnect fittings to test stand.

ADDITION TO GOVERNOR TEST STANDS—The application of Hansen 3,000 series quick-disconnect fittings to the Wabash's Woodward Governor Test Stand at the Decatur, Ill. shops has brought two advantages. It saves time in checking a governor because pipes no longer have to be hooked up; instead it takes but an instant to



Connecting tubing is behind the door in the back of the stand and completely out of the way.

connect the fittings to the proper part of the governor. Second, the test stand connections are completely out of the way when not in use, and all the connecting tubing is behind the door in the back.

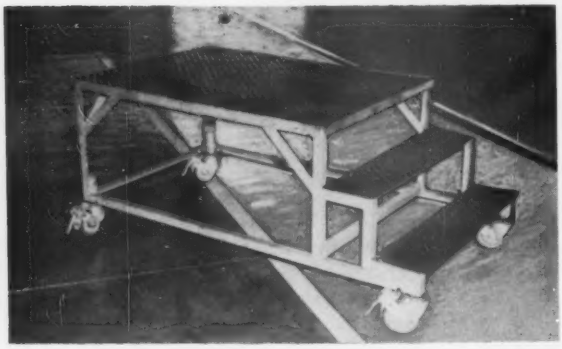
When a governor is to be tested, it is secured to the test stand in the usual manner, except that the coupling connection for the various hoses can be made in a few seconds rather than minutes as is required with the usual arrangements when piping has to be hooked up.

CLEANING SPACER RINGS—This device saves considerable time in cleaning spacer or firing rings, as each time the cylinder heads are taken off these rings must have the carbon removed. The old method of cleaning rings by hand required two hours to clean 16 rings and with the machine illustrated 16 rings are cleaned in eight minutes, which affords an appreciable saving in man-hours for each engine overhauled.

The device is made by mounting a small Thor air grinder and cup-shape wire brush above one edge of a round table which has a boss machined on top to hold the ring while cleaning. The table has a spindle which

Device for cleaning cylinder-head spacer or firing rings, EMD 567-type engines.

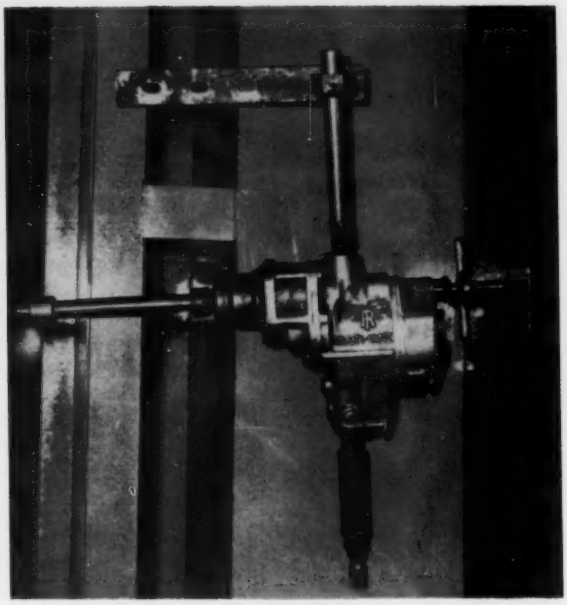
slides up and down in two ball bearings fitted in an upright housing. The table spindle is spring loaded to hold the table and ring up against the brush. This brush spinning on the edge of the table causes the table to revolve and the ring is completely cleaned. To remove or replace rings, the table is compressed by hand and rings are slipped on and off.



Work stand for ends of diesel engines is braked on all four wheels.

STAND FOR ENDS OF ENGINES—The shop forces of the Wabash at Decatur, Ill. have built a work stand which is handy for jobs on the end of the diesel engines. These work stands for the ends of the engines are portable and supplement work stands which the Wabash uses for jobs along the sides of the diesel engine.

The stand has a top area 3 ft. by 4 ft. and is 26 in. high. The top is made of Four-Way plate ¼ in. thick. The four rubber-tired wheels swivel, with the brake on each wheel locking both the wheel and the swivel. The superstructure of the stand is built up from ¼ in. by 1¼ in. by 1¼ in. angles and ¼ in. by 1¼ in. strap iron.

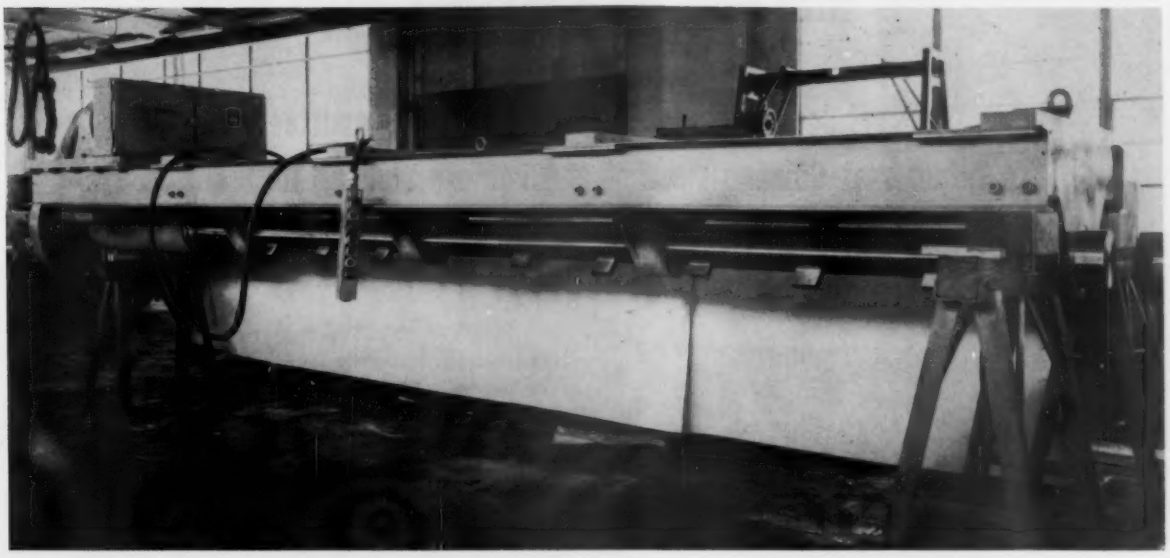


Bracket attachment that supports air motor for turning crankshafts in Alco engines.

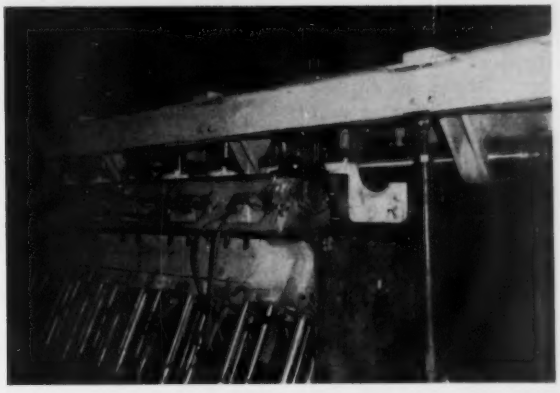
BRACKETS SIMPLIFY TURNING CRANKSHAFTS—A bracket such as shown eliminates the need for holding the air motor while turning crankshafts in Alco engines. The brackets support the air motor after the engine is removed, relieving the operator from holding the motor and letting him operate the throttle only.

The brackets bolt to the governor base when the governor has been removed from the engine. Cross section area of the bracket is ½ in. by 2 in. The length of the bracket shown in the illustration is 13 in., but this length is variable to suit to the length of the bracket extension.

PORTABLE BORING BAR—The Wabash is currently trying out at the diesel shop in Decatur, Ill. a portable boring bar on Alco and Baldwin engines. The boring bar, furnished by Giddings and Lewis, is expected to be used about the shop to line bore and diesel engines. It could if desired be sent to other points on the system



Portable boring bar used by the Wabash for line-boring Alco and Baldwin engines.



The bar rests on rail sections on top of the engine and is adjusted for correct height by shimming.

although the Wabash does not propose to do this as all heavy repairs to diesel engines are made at Decatur.

The boring bar is self-contained, having its own electric motor and controls for boring and feed. It rests on rail sections on top of the engine's frame and is set at the correct height for boring by shimming. The bar is held in accurate alinement to its frame by five integral boring bar bearings.

CLEANING AIR COMPRESSOR VALVES—Difficulty in properly cleaning hard carbon from air compressor valves with the agitated cleaning tank and cleaning solution formerly used in a western railroad shop led to the construction of the special-equipped tank shown. This was made by taking a small tank at the shop, fitting up a basket to go inside the tank and mounting a windshield wiper on top of the tank so that when the wiper arm goes back and forth it pulls an arm up and down inside the tank. This in turn moves the basket up and down in an Oakite No. 17 cleaning solution for agitation, effectively removing hard carbon from the air compressor valves.

Lid raised on special tank for cleaning hard carbon off air-compressor valves.

Hot Box Reduction Still Major Mechanical Division Goal

General Committee acts on 16 standing committee reports at Chicago meeting and hears promising initial progress report on current M.D.T. fitted bearing test.

H. T. Cover,
Chairman

IN THE ABSENCE of an AAR Mechanical Division annual meeting this year, the General Committee in session at Chicago June 29 and 30, transacted the business of the division and disposed of 16 standing committee reports which were presented by individual chairmen. With a few editorial corrections and minor changes, all of the reports were accepted, subject to letter ballot approval of necessary items.

Brief abstracts of these reports reflect an active year, with especial emphasis on hot box studies. The Mechanical Division, through its Research Department and various committees, is still trying to find a real solution to the hot-box problem. One of the most promising efforts is the fitted bearing test now being conducted in conjunction with the Merchants Despatch Transportation Corporation, an initial progress report of which was presented at the General Committee meeting. One thousand refrigerator cars, equipped by this builder with step-size journals and both standard and fitted bearings, made almost 12 million car-miles up to May 31, 1954, the ratio of bearings removed on account of overheating being 1 to 26 in favor of the fitted bearings. The results of more extensive tests, including the difficult hot summer months are awaited with keen interest.

New Officers of the Division

The General Committee sessions were presided over by Chairman H. T. Cover, assistant vice-president and chief of motive power, Pennsylvania, who asked to be relieved of this duty even though new officers of the division are normally elected only at the time of annual meetings. Subject to letter ballot approval, D. S. Neuhart, general superintendent motive power and machinery, Union Pacific, will serve as the new chairman of the Mechanical Division; F. K. Mitchell, assistant vice-president, equipment, New York Central, as vice-chairman; and J. W. Hawthorne, general superintendent motive power and equipment, Atlantic Coast Line, as incoming new member of the General Committee, in place of A. G. Kann, general superintendent of equipment, Illinois Central, retired.

At the opening session of the General Committee, brief remarks were made by R. G. May, vice-president, AAR, who stressed the importance of standardizing railroad parts and materials not subject to constant improvement, but said that this standardization must not be carried to a point where it will have any tendency to "stifle progress." He called for greater speed in devoloping new car designs requested by shippers to reduce material handling costs, afford additional load protection and expand railroad service.

Brakes and Brake Equipment

The last two paragraphs on Manual page B-70 were recommended for revision as a letter ballot item. One revision eliminated the provision to remedy leakage in a porous coupling casting by peaning and makes it mandatory to reject the coupling because the porous condition is aggravated rather than corrected by the peaning. The second revision eliminates the previously allowed leakage of four pounds from 70-lb pressure in one minute. The rule now requires that couplers must be free from leakage as the 4-lb drop allowance was in conflict with page E-14-1950 which permits no leakage at all in the finished assembly.

The mechanical research office has been asked to conduct some tests to formulate definite physical specifications for coupling hose.

A sub-committee has been appointed to investigate the present method of gaging worn hose couplings as some have been found in

D. S. Neuhart,
Vice-Chairman

Fred Peronto,
Secretary

V. R. Hawthorne,
Executive Vice-Chairman

service worn to the extent that the leakage cannot be corrected by renewing the gaskets.

The alternate single car test device shown on Manual page B-18 was recommended for deletion through letter ballot action as it is not adaptable to additional desirable features now being considered.

A check was made by a sub-committee of brake system leakage on 4,762 freight cars through the use of a flowrator in conjunction with the single car test device with the following results:

	Per Cent
Cars tested with flowrator	100.0
Cars passed flowrator leakage test	71.4
Cars condemned by flowrator	28.6
Cars with leakage in brake pipe & fittings	22.6
Cars with leakage in AB valves & fittings	1.3
Cars with leakage in reservoir pipes & fittings	8.0

This is an improvement over last year's check when 34.6 per cent of the cars failed to pass the flowrator device test. Therefore the committee has approved the flowrator in principle but has referred it back to the manufacturers for re-calibration.

The committee found no objections to substituting Meriam Unity for water in the manometers of present AB test racks, but the oil must not be used in place of carbon tetrachloride as the specific gravity is the same as water.

Because investigation revealed that too many gaskets suitable for further service are being scrapped under present condemning limits, letter ballot action was recommended to reduce the present condemning limit for AB cover gaskets from .175 in. to .172 in. and to change the dimensions of the gage shown on page B-20J accordingly.

A recommendation to the general committee that the QRR freight cylinder release valves be approved for use in general interchange has been approved and maintenance and testing instructions have been issued.

The committee recommended as a letter ballot item inclusion in the manual of a specification for a brake cylinder release valve for freight brake equipment which defines and prescribes minimum functional and mechanical requirements for use with standard freight brake equipment as covered in manual pages E-55 to E-59.

The final letter ballot item proposed to include in Section E of the manual specifications for freight type automatic brake slack adjusters including an appendix covering instructions on how to get a certificate of approval.

New standards for hexagon heads, cap screws and nuts will require wrenches for the old and the new style to be available, and the committee has therefore approved revision of inspections to include description and piece number of the necessary tools.

The committee looked unfavorably on operating diesel units with No. 6 type brake equipment in multiple with unit having 24-RL equipment as too many advantages of the 24-RL are lost.

Investigation indicates that improper maintenance of AB valve portions and non-compliance with Rules 100 and 101 are the main causes of stuck brakes in freight trains. Restricting train leakage will help, but the principal causes are found in the condition of the brake pipe and related piping. During cold weather, other contributing factors are defective angle cocks, leakage through brake pipe hose nipples at angle cock, leakage through hose clamps, defective and worn couplings and hose coupling gaskets.

An air brake manufacturers' request to furnish ABMC equipment on cars offered in interchange was turned down as the committee did not feel that this equipment should be approved for unlimited use without service trial but will be governed by the wishes of the general committee on further actions.

To insure standard performance and avoid hazards, the committee recommended for publication a set of instructions on the re-application of used freight brake equipment to new cars. Rule 60 was recommended for modification to the arbitration and price committees to permit changing out a defective portion of AB-1-B equipment the same as UC and D-22 valves. This will avoid delay to shipments on passenger box cars equipped with this type brake.

The committee has granted permission to manufacturers to furnish a new design angle cock which prevents the handle from becoming closed unintentionally while in train movement. Such equipment will be checked for a year and if satisfactory a new design will be recommended as a letter ballot item for adoption as AAR Standard.

Geared Hand Brakes

As of May 28, AAR Certificates of Approval have been issued for a total of 33 types of geared hand brakes—21 vertical wheel type, 9 horizontal wheel type and 3 lever type, all of which were listed in the report.

Drawings of geared hand brake manufacturers have been revised to incorporate approved changes in compliance with paragraph 13 of Appendix A, and the revisions included in the certificates of approval.

The committee had 14 recommendations for letter ballot action, among them one which extends the jurisdiction of the AAR to include the kind and grade of materials used in geared hand brakes and a new rule which would require that hand brakes operate in harmony with slack adjusters, either automatic or manual. The committee also proposed a new interchange rule which was adopted to the arbitration committee requiring periodic dismantling of geared hand brakes for internal inspection.

Couplers and Draft Gears

The Sub-Committee on Couplers in cooperation with the Committee on Specifications for Materials included with its report a new specification, M-207, covering the purchase and

acceptance of all A.A.R. approved cast steel yokes for use with Types E, F and H couplers and with both conventional and twin cushion rubber draft gears. A provision in this specification requires each manufacturer to obtain from the A.A.R. an identification number which must appear legibly on each yoke for each design of yoke produced. The Committee recommended that the specification be submitted to letter ballot for adoption.

Magnetic Particle Inspection

In response to a suggestion that an addition be made to Specification M-204 requiring that new coupler bodies and knuckles be magnetic particle inspected the committee has sent questionnaires to member roads. Replies have not been received from all roads and no recommendation was made by the committee.

Swivel Shank Coupler Failures

Another questionnaire has been sent out to determine the number of cars equipped with swivel shank couplers and the number of failures experienced in 1953. This action was taken because a member road reported a large number of failures with the Type E swivel shank coupler. The action to be taken will be based on the results of the questionnaire.

Reclamation of H.T.S. Coupler Locks

In answer to a member road's question as to the heat treatment required during and after the reclamation of high tensile steel coupler locks by welding the committee made an editorial change on page C-67 of the Manual. This change prescribes the same treatment for coupler locks that is called for on Page C-68 for high tensile steel coupler bodies and knuckles.

Spring Type Carrier Irons

The committee investigated a complaint of a member road reporting coupler partings with cars equipped with spring type carrier irons for Types D and E couplers. The investigation showed that the springs used in the original design were weak; these springs were stiffened later and a majority of the carriers sold have the heavier springs. The committee did not feel justified in recommending that these devices be ordered off cars because it believed that with car retirements and spring renewals that few of the carriers with the original objectionable springs are still in service.

Tests of Controlled Slack Coupler

Ten tests of controlled slack coupler for comparison with the Type H tightlock coupler were started on March 15, 1954 and completed on April 27, 1954. Seven of the tests were made at the Technical Center of the National Malleable and Steel Castings Company, Cleveland, Ohio, and three were made at the Alliance, Ohio, plant of American Steel Foundries. All tests were made in the presence of representatives of the committee and standard coupler manufacturers. Because of the importance of the subject an analysis of the voluminous data could not be made and a committee meeting could not be held in time for the annual report. A report and recommendations will be made as soon as possible and, if the General Committee approves, it may then be handled by special letter ballot.

Second-Hand Draft Gears

In its 1953 report the Sub-Committee on Draft Gears recommended (1) That defective draft gears removed from foreign cars be credited as scrap and reported to the owner for disposition; (2) That the application of second-hand draft gears to foreign cars be prohibited and, (3) That the application of second-hand draft gears in good condition be permitted only in system cars. These recommendations were approved by letter ballot; however, because of a considerable negative vote the General Committee remanded the matter to the sub-committee to find a more acceptable solution, if possible. The principal comment was against proposal (1).

The questions of proper credits for defective draft gears and how to repair them are old. A joint sub-committee of the Coupler and Draft Gear Committee and the Price Committee studied this matter in 1948 and had a large number of defective gears sent into a central point for examination with the thought that some code of rules could be worked up for repairs. With 24 approved gears and 37 non-approved gears currently listed in the Interchange Rules, and changes made to the list every year, it was found impossible to lay down a code of rules for overhauling such a variety of gears. The committee felt that the matter could be best controlled and policed, and accordingly recommended, that defective gears be credited as scrap value and returned to the owner when requested by the owner, such gears to be reapplied only to his own cars. It was reasoned that the owner would suffer no penalty if he got his gears back and repaired them and reapplied them to his own cars. It was felt that the owner would be more concerned with proper repairs if his only outlet was on his own cars because if he applied inadequately repaired gears to his own cars these cars would suffer more damage from impact than the mating car.

The committee's underlying concern in this matter is to set up rules to insure that second-hand gears are in proper condition to go into foreign cars and that the owner may be fairly billed for 75 per cent of price new for such gears as presently called for in the Interchange Rules. To accomplish this the committee has drawn up a proposed Specification M-901-B, entitled "Approved Reconditioned Draft Gears, Other Than Rubber, For Freight Service", shown in Exhibit B of the report.

Briefly, this new specification states that defective gears, when removed, shall be completely dismantled, inspected, and repaired, and that at least 20 per cent of such repaired gears chosen at random shall be tested for capacity under either a 9,000 lb or 27,000 lb. tup, whichever the repair point has available. It is felt that it would be unreasonable to expect that repaired gears, short of a complete renewal of all parts, would have the minimum capacity requirement (18,000 ft. lb.) of a new gear; hence, this specification calls for a minimum capacity of not less than 90 per cent of the required capacity for a new gear, or 16,200 ft. lb.

Practically all gears on the approved list, and many on the non-approved list, have, when new, a capacity in excess of 18,000 ft.-lb. minimum, and many will no doubt meet, or better, the 18,000 ft.-lb. requirement for new gears.

The proposed specification restricts the application of repaired gears, not tested by sampling, to owners' cars only.

The proposed specification does not specify scrap credit only for defective gears removed, as the committee recommended the Interchange Rules are equitable providing gears are properly overhauled and proven to be properly overhauled by testing sample lots of at least 20 per cent of the gears overhauled.

The committee recommended this specification for letter ballot.

Cost of Certifying Draft Gears

Before a new design of draft gear is issued a certificate of approval by the committee, sample gears are subjected to tests prescribed in Specification M-901. During the year the equipment for making these tests has been moved from Purdue University to the A.A.R. Research Center, Chicago. These tests have been billed to the manufacturer at $300. for the test of capacity as received, known as the "spot test", and $1,600. for the complete tests. Due to increased costs for labor and material, the committee, on recommendation of the director of mechanical research, A.A.R., has approved increasing these charges to $350 and $1,900, respectively and the secretary has been instructed to notify the manufacturers accordingly.

Certified Draft Gears

Waugh Equipment Company's Type WM-DC-5 rubber cushion draft gear has been tested and, having met all the requirements of Specifications M-901 A, has been issued a conditional certificate of approval, with applications limited to 6,000 gears until check tests can be made after two years' service. This gear will be added to Section 1 of Interchange Rule 101.

Hulson Type 202 has been removed from the list of non-approved draft gears and placed in the list of obsolete types of gears. This action was based on results of check tests from service of Hulson Type 202-A gear, which differs from Type 202 in that the 202-A gear has springs of increased capacity.

Hulson Type 202 Modified and Type 202-A will remain in the list of approved draft gears as conditionally approved and will be tested again after three years' service.

The Peerless Equipment Company has made changes in design

and materials of their conditionally approved draft gear Type D-A. This gear will be resubmitted for specification tests.

Short Draft Gears for Cars

The following short draft gears for pocket lengths of 17½ in. and 18½ in. were tested and approved and will be added to Section 1-A of Interchange Rule 101: Cardwell Westinghouse Type L-20-S and National Malleable & Steel Castings Company's Type MF-294-A.

Check Test of Certified Draft Gears

The checking of certified gears after 2, 4, 10 and 15 years' service was curtailed during the past year due to the drop hammer being out of service while being moved from Purdue University to the A.A.R. Central Research Laboratory in Chicago. The check testing will now be carried on as rapidly as conditions permit.

New Gears

An application has been received from W. H. Miner, Inc., for a test of their Class FR-9 Draft Gear.

This part of the report was submitted by the Sub-Committee on Draft Gears of which the chairman was I. N. Moseley, research and test engineer, Norfolk & Western.

Loading Rules

The Committee on Loading Rules reported 35 inspections of new or revised loading methods, 16 of which have been tested with experimental loads and five completed, approved and progressed through the various sub-committees for inclusion in the next revision of the rules.

The Department of Defense pamphlet, MD-7, covering military material loaded on open-top cars and referred to in last years report, was issued effective last October and made available in a single pamphlet the latest rules for safe securement of these widely-varying and highly-important loads.

All loading rules are subject to change and improvement each year and the committee recommended in its 1954 report a number of revisions of the general rules, such as: covering red, or amber lights, or reflectors, so as to prevent reflection and avoid conflict with train operating lights or signals; sealing or twist-tying high tension bands or wires so as to assure 85 per cent of full strength; inclusion of fir as acceptable for bearing pieces, braces, cleats, wedges and blocks.

The committee also recommended that loading machines be acceptable for shipment with treads extending beyond the car floor, providing the machines are centrally located and the extension does not exceed one-half the tread width on each side. Full support for the overhanging counter-weight of rotary cranes was urged as a mandatory requirement.

In Section B of the report, a list of subjects being progressed with a view to additional loading rule revision included 9 steel products, 1 machinery, 4 pipe, 6 miscellaneous commodities, 9 crawler-type and wheeled vehicles, 13 department of defense material.

The committee reported working with the American Iron & Steel Institute to develop loading methods which will assure more nearly damage-free shipment of hot and cold-rolled steel products and thus facilitate return of some of this tonnage to the rails. The necessity was again stressed of maintaining flat-car floors and anchorage devices in better condition, generally, than at present to attract and hold car loadings, especially of farm equipment and road building machinery.

Forest Products Loading

The Special Committee on Forest Products Loading recommended numerous rule changes which were approved by shippers and found necessary in the interest of safer rail shipments. In the loading of piles, for example, it was recommended that piles be prepared with one square end to assure a more stable load; that piles be located not over 6 in. apart to permit normal end shifting without need for readjustment, that overhang be reduced on shorter lengths of small lumber and confined to one end.

The loading of packaged lumber in lengths of 7 ft. and over was approved, contingent upon a full complement of side stakes and additional high-tension band securement. Several changes were approved in pole-loading figures, at the request of shippers, and experimental shipments authorized

The committee expressed the opinion that, with the cooperation of neutral inspectors, the On-The-Ground committee and shippers, the changes agreed on will result in greatly improved lumber shipments and definite reduction in number of load adjustments necessary en route, the latter being dependant more or less on the kind of handling cars get in rail movement to destination.

Safety Appliances

Since the last report 93 applications were submitted. The committee handled cases where there was no precedent, these involving 105 designs.

Approval was granted on a U. S. Navy request for safety appliance on a flat car design for shipping naval ordnance.

Approval was granted for Grip-Strut metal running board for listing under Group 1, Interchange Rule 3; change in design of Kerrigan metal gratings listed in Groups 1, 2 and 3 of Rule 3; request from U. S. Gypsum for approval under its name to be listed as U. S. Gypsum weld-forged gratings, Types KCS, KTCD AND KTC in above-mentioned groups of Rule 3.

Two requests in process are: (1) for approval of safety appliance on special design of multi-unit tank car (Taylor-Wharton Iron & Steel Co.) and (2) safety appliances on Evans double-deck flat car for shipping assembled automobiles.

Changes in Material Prices

The prices of a large number of items of material to be used in billing for repairs have been reduced in the proposed revisions of the prices and credits in Rule 101. These include gaskets for flanged pipe fittings, for K type triples and AB brake valves, single-weight pipe ground-joint unions and union elbows, and several types of journal-box lids, both pressed steel and malleable iron. None of these decreases is large. The net balance of the reductions in charges and credits for journal bearings is of the order of one cent—in some cases, nothing. The decreases also include brake shoes and brake-shoe keys and geared hand brakes, both horizontal and vertical. Lumber prices are decreased fractionally. Cast-iron wheels for all journal sizes show decreases ranging from $1.05 to $2.66, while the prices of one-wear wrought-steel wheels increased by 10 cents per wheel. Prices of standard axles have advanced from 50 cents to $2.15. No. 2 plus and No. 15 trussed brake beams have advanced 25 cents. All approved draft gears 22-⅝ in. and 24-⅝ in. long advanced $1.00. Changes in the prices of non-approved gears varied from slight reductions to increases of 75 cents.

Prices have been included for two Boxweld brake beams, one a hanger type and one hangerless. Both now have conditional certificates of approval.

A charge of 12 cents has been added in Rule 107 to provide for trimming the spread lining of journal bearings.

The charge for removing a hangerless type brake beam when renewed in connection with the removal and replacement or repair of truck castings or wheels in trucks with integral journal boxes has been extended to apply also to a second brake beam renewal in the same truck.

A charge for cleaning, lubricating and repairing AB and AB-1-B freight brake equipments has been modified to include a charge for the application of the improved non-metallic emergency graduating valve.

The new reproduction pound prices recommended in Rule 112 for use in determining reproduction for the purpose of ascertaining settlement value per freight car are increased a fraction of a cent for all types except refrigerator cars. These prices are based on the cost of 52,034 freight cars built during 1953. It is also proposed that covered hopper cars equipped with an air pipe to facilitate unloading and with special load-

MECHANICAL DIVISION OFFICERS

1952-1954

CHAIRMAN: H. T. Cover, assistant vice-president and chief motive power, Pennsylvania System.

VICE-CHAIRMAN: D. S. Neuhart, general superintendent motive power and machinery, Union Pacific.

EXECUTIVE VICE-CHAIRMAN: V. R. Hawthorne.

SECRETARY: Fred Peronto.

DIRECTOR OF MECHANICAL RESEARCH: W. M. Keller.

GENERAL COMMITTEE MEMBERS

H. T. Cover.

D. S. Neuhart.

F. K. Mitchell, assistant vice-president—equipment, New York Central System.

B. M. Brown, general superintendent motive power, Southern Pacific.

A. K. Galloway, general superintendent motive power and equipment, Baltimore & Ohio.

J. P. Morris, general manager, Mechanical Department, Atchison, Topeka & Santa Fe.

M. R. Brockman, assistant vice-president, Southern.

J. F. Ryan, superintendent machinery, Louisville & Nashville.

J. L. Robson, chief mechanical officer, Great Northern.

A. C. Melanson, chief motive power and car equipment, Canadian National.

C. E. Pond, general superintendent motive power, Norfolk & Western.

COMMITTEE CHAIRMEN

NOMINATING—G. E. Bennett, superintendent motive power, Chicago & Eastern Illinois.

ARBITRATION—W. N. Messimer—manager equipment, Merchants Despatch Transportation Corp.

SUB-ARBITRATION—R. W. Hollon, mechanical inspector, Chicago, Burlington & Quincy.

PRICES FOR LABOR AND MATERIAL—T. J. Boring, general foreman, M.C.B. Clearing House, Pennsylvania System.

SUB-PRICE—J. E. Rose, general inspector, AAR Interchange Regulations, Canadian Pacific.

CAR CONSTRUCTION—J. A. Gower, assistant mechanical engineer, Pennsylvania System.

PASSENGER-CAR SPECIFICATIONS—R. H. Graff, assistant engineer—car engineering services, New York Central System.

BRAKES AND BRAKE EQUIPMENT—T. H. Bickerstaff, supervisor air brakes, Atchison, Topeka & Santa Fe.

GEARED HAND BRAKES—H. B. Wolfe, engineer car construction, Atchison, Topeka & Santa Fe.

COUPLERS AND DRAFT GEARS—C. K. Steins, mechanical engineer, Pennsylvania System.

LOADING RULES—W. B. Moir, chief car inspector, Pennsylvania.

FOREST PRODUCTS LOADING—F. G. Moody, superintendent car department, Northern Pacific.

LOCOMOTIVE—A. G. Hoppe, mechanical engineer, Chicago, Milwaukee, St. Paul & Pacific.

SAFETY APPLIANCES—W. O. Teufel, assistant chief motive power, Pennsylvania System.

SPECIFICATIONS FOR MATERIALS—W. F. Collins, assistant chief—engineering services, New York Central System.

TANK CARS—J. E. Keegan, chief car inspector, Pennsylvania.

WHEELS—P. V. Garin, engineer of tests, Southern Pacific.

LUBRICATION OF CARS AND LOCOMOTIVES—R. E. Coughlan, chief metallurgist and engineer tests, Chicago & North Western.

AXLE AND CRANK-PIN RESEARCH—W. M. Keller, director of mechanical research, Mechanical Division, AAR.

FREIGHT-CAR ROLLER BEARINGS—F. Fahland, general mechanical engineer, Union Pacific.

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ing or unloading devices permanently attached and tank cars with tanks of metal other than flange quality open-hearth boiler-plate steel are to be settled for on a reproduction cost basis.

Studies are to be made by a special subcommittee to determine whether labor and material prices can be established for repairs to refrigerator-car air circulating fans.

The pattern of the changes in passenger-car prices are similar to those for freight cars.

All changes in material prices were rechecked as of March 1, 1954, from quotations furnished by purchasing agents of ten railroads representing all sections of the United States and Canada and comprising 39 per cent of the freight-car ownership of these countries. They become effective August 1, 1954. Another check will be made in October, and needed revisions made effective January 1, 1955.

Specifications for Materials

The committee recommended changes and revisions of the following specifications, the changes, in each case, to be submitted to letter ballot:

M-101, Interpretation of defects considered injurious in axles. Embodied in report as Appendix A to be added to Spec. M-101 if approved. Editorial changes in Sections 14 (b) and 14 (c).

M-207, New specification covering the purchase and acceptance of AAR approved cast steel yokes for use with conventional and twin draft gears.

M-306, Welded Wrought Iron Pipe; changes in Sections 1, 2, 16 and 20 and in Table II made to effect consistency with commercial practice.

M-617, New specifications for hose used in handling diesel fuel oil.

M-910, Renovated Journal Box Packing; extensive revisions as well as additions to two new sections on "Definitions of Terms" and "Material". Addition of appendix giving example of conversion to clean dry waste referred to in Section 9 (a). Inclusion of a more realistic limit on tarry matter based on laboratory analysis of renovated packing.

M-911, Specifications for brushes have been rewritten to eliminate emergency status since revocation of NPA Order M-18 and to include use of European bristle having no dye.

Other Recommendations

M-107, change, already approved by letter ballot, in Section 9 covering ladle analysis to permit spectrographic analysis to be made upon next issue of revised manual pages.

M-403, Last sentence in Section 4 to be moved to Section 9 (b).

M-918, Proposed specifications for diesel crankcase lubricating consisting of specification, agreement and test manual is now practically ready for submission to full committee membership for action.

A progress report, dated August 1953, on the completion of six full-scale field service tests of fuels selected to investigate the effect of variations in sulphur content, ignition quality and end point has been distributed for the confidential information of railroad personnel.

Tank Cars

During the past year the committee recommended a number of amendments to both AAR and ICC specifications, with the latter concurred in by the Bureau of Explosives and accepted by the ICC. All such recommendations become effective during 1953. The complete specifications for tank cars is being re-written to incorporate all changes since 1941. The revised edition will be in loose leaf form to simplify keeping it current, and is expected to be available early next year.

Locomotives

The name of this committee has been changed to "Committee on Locomotives" and henceforth will function with a chairman and one vice-chairman.

The committee is maintaining an open docket on the subject of air supply for locomotives other than steam (ICC, Rule 205A) and reports from roads indicate little difficulty in satisfying the requirements of ICC Inspection Bureau.

The subject of steam locomotives occupied little of the committee's attention this past year, only such matters as these being considered: (1) suggested elimination of Section I of manual covering "Rules for Fuel Economy on Locomotives" (2) presented statistics showing performance of the several types of motive power, the proportion of traffic handled by each and the observation that the "figures show that as the steam locomotives are relegated to less important assignments, involving relatively a greater proportion of stand-by losses, the cost of fuel for steam locomotives is all out of proportion to the percentages of traffic handled in the various services."

In 1952 a recommendation was made discouraging the use of compromise or modified brake equipment designed to permit multiple-unit operation of switching or road-switching locomotives equipped with Type 6-BL or 6-SL brake schedule with road locomotives having 24-RL schedule. However, it now appears that there is a demand for such equipment and tests have been conducted with a proposed arrangement. Test results are expected shortly.

Flange Lubricators

Originally the subject of flange lubricators was a study to develop suitable means for lubricating diesel-electric locomotive driving wheel flanges to prevent or reduce flange wear when heavy dynamic braking is employed. Units operating in multiple are reported to have a tendency to "jackknife" under heavy buff especially where road switchers are used in multiple in pusher service, those roads reporting over-turned rails under heavy buffing stresses on tangent track. Because of the relationship to track conditions this phase of the problem has been referred to a joint committee to determine what steps should be taken. Remedies suggested include bolster stops, shimming of coupler yokes and the use of Type F couplers. Tests, with box cars, under 180,000 lb pushing pressure indicate 3,700 lb lateral pressure with the Type F coupler as compared to 4,500 lb with the rigid shank Type E couplers and 22,700 lb with swivel shank Type E.

Dynamic braking has introduced the problem of flange wear on straight track on descending grades and in pusher service on straight track on accending grades and the committee suggested that any of the established designs of flange oilers will do a good job, if properly maintained.

A number of roads are trying a simple stick lubricator with molybdenum disulphide without springs. One road reporting that a ¾ in. diameter stick 10 in. long lasted about 60 days in switching service

Diesel Locomotive Filters

The committee, with Mechanical Research, is endeavoring to determine (a) the most effective and practical filter medium and (b) to effect standardization for filters for fuel oil, lubricating oil, engine air, car body air and compressor air intake. The committee offered two sets of drawings, of fuel oil filters and elements, as indicative of the need for standardization and is collecting data preparatory to further study.

Attention was directed to the fire hazard incident to the accumulation of oil, carbon and dust in shop and terminal exhaust ducts, jacks or stacks so that necessary cleaning procedure can be set up.

Gas Turbine Locomotives

The report contained information on the status of gas turbine locomotives on the Union Pacific, the coal-fired locomotive equipment at Dunkirk, N. Y. and a 300 hp oil-fired gas turbine locomotive to be built for the U. S. Army by Davenport- Besler and scheduled for completion this year. It also mentioned five foreign gas turbine developments, with little new material to report beyond that already published.

The committee reported that a special AAR Committee has been assigned to follow the atomic-powered locomotive concerning which there has been recent publicity.

Two comments in the report are of current interest: (1) the fact that the Westinghouse oil-fired gas turbine locomotive has been removed from service and dismantled with no additional locomotives of this type being under consideration; (2) the Norfolk and Western 4,500 hp steam turbine electric locomotive. (Subsequent to the preparation of the Committee report the locomotive has been placed in test service on the N&W—Editor)

The report referred to a letter ballot item on standardization of cap bolts for roller-bearing journal boxes. After study by research department revised data has been developed which will be submitted to letter ballot as originally proposed.

The committee recommended revision of Manual page L-27 to retain the use of "Heavy" pattern bolt heads on steam locomotives and to specify "Finished" bolt heads and nuts, as in ASAX Bulletin B-18. 2-52 for diesel and electric locomotives.

Lubrication of Cars and Locomotives

The committee referred to road service tests of three new brands of roller bearing grease, but said that milage requirements have not been made and no additional approvals granted during last year. Apparently there is no doubt of the ability of present approved greases to lubricate roller bearings satisfactorily, but the question of lubricant retention is still troublesome.

In connection with journal box lids, three requests for minor changes in design under existing certificates were granted and one lid, in the 6½-in. 12-in. size, recommended for AAR approval. Rubber seal gaskets for journal box lids, made by the Roth Rubber Company, Chicago, were tested and authorized for all approved lids except those of the Symington-Gould type. The report referred to the modification of various spring packing retainers at the collar end as promising solution of the damaged-collar problem since there have been no reports of damage with the latest revised designs.

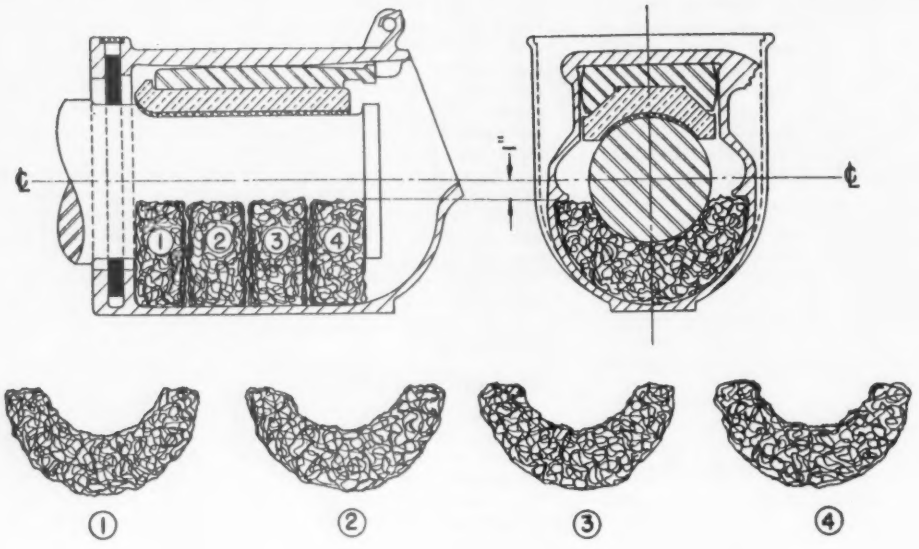


Fig. 2 — Loose waste shall be matted together into rolls, number of rolls per box optional. Last roll applied should be large enough to fill out without using smaller piece. Tuck under all loose ends.

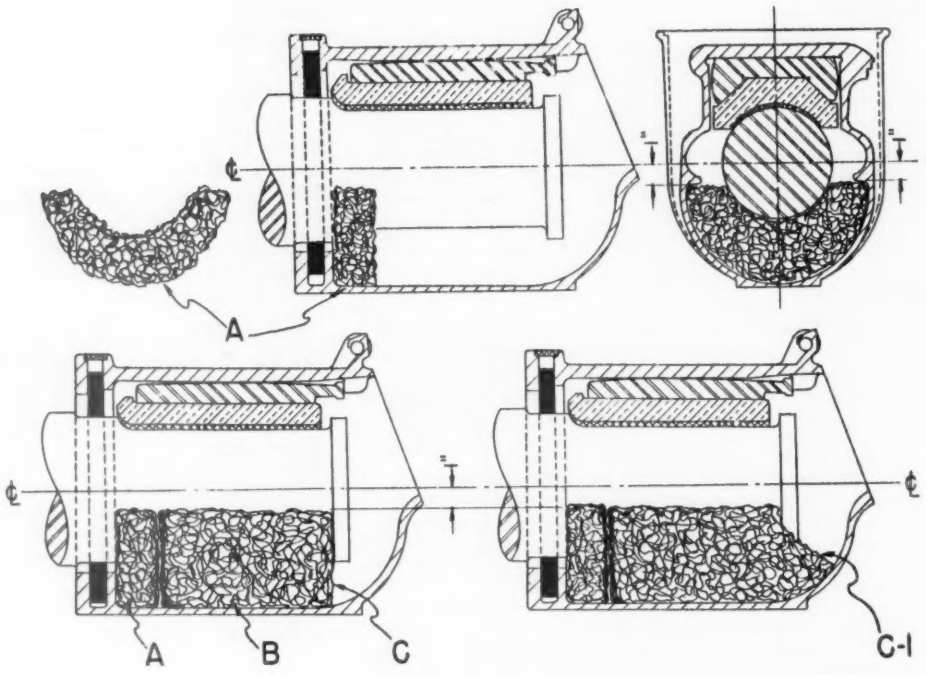


Fig. 1 — With spring packing retainers, packing should extend straight down from journal collar as shown at C.—Use a 45-deg. angle as shown at C-1 without retainers, or with Hulson Plypak containers.

The report summarized the work of the AAR Mechanical Research Department in lubrication matters to date, referring specifically to Report MR-210 dated December, 1953, which analyzes data relative to 74,472 freight hot boxes on 14 member roads. Joint participation with the Pennsylvania in a road test program will be covered in a new report, MR-218. The Armour and Franklin Institute investigations are being continued, also the the MDT study of journal bearing performance in service, considerable data having been assembled, but no conclusions yet reached

The committee decided against a requested extension of the time limit for lubrication of roller bearing equipment, pending additional experience under present Rule 66-A. Several changes were recommended in the Lubrication Manual, including a suitable gage for reclaiming second-hand journal bearings, provision for front packing finished straight down when spring packing retainers are used and at an angle of about 45 deg. without retainers or with Plypak type packing containers, adoption of a revised method of stacking journal bearings.

Over 3½ million miles were reported with the Empire lubricator device on 70 cars, both freight and passenger, and it was agreed to forego further laboratory tests with improved back ring and cover seals, making approval for added installations above the 1,000 car sets of this device now authorized, dependent upon road service results.

Service tests were approved for journal lubricator pads and packing rolls furnished by the Miller Waste Company, National Waste Company, Journal Box Servicing Corporation, also the McLeod roll. Although several hot boxes were reported with Laudig iron-back journal bearings, the general service experience with this bearing was reported as satisfactory. A check of Plypak applications to 4,650 70-ton cars since April, 1952, showed a ratio of 1 to 4.299 hot boxes, as compared with conventional packed boxes, or a reduction of 77 per cent in favor of the Plypak cars.

With the RS journal stop and packing retainer, impact tests at speeds up to 9½ mph showed no displacement of packing and journal bearing dislocation and damage were prevented. A test was made to determine if the prolonged contact between journals and the RS stop would produce overheating. Heavy breaking or a test car on 21 miles of grades from .5 to 2.25 per cent failed to show this effect. As a result of these tests, the application of the latest design of RS journal stop and packing retainer was authorized up to 1,000 car sets in general interchange service.

The report recommended increase in the journal box repacking period from 15 to 18 months.

Report on Wheels

The Committee on Wheels studied a proposal to extend the prohibition of chilled iron car wheels on 70-ton covered hopper cars to all freight cars of 70-ton capacity, or more, and found insufficient evidence to support this additional restriction.

To permit expanding production facilities, the Southern Wheel Division was granted permission to produce up to 100,000 experimental AARX-2 cast steel wheels for interchange service with the understanding that a performance report be submitted quarterly for review by the committee, as is done with AARX-3 cast steel wheels made by the Griffin Wheel Company.

Appendix A of the committee's report shows that 188 AARX-2 wheels made 3,678,100 car miles up to March 1, 1954, 29 of the 46 test cars exceeding 50,000 miles each and 12 making over 100,000 miles, each. The new Southern wheel plant at Calera, Ala., poured its first 12 wheels on February 25 and is expected to produce up to 160 wheels a day by the last quarter of this year.

As of March 1, 1,080 AARX-3 wheels were in service on 221 cars which had made a total of 5,227,117 car miles, 23 cars having accumulated over 50,000 miles each. In addition to these 1,080 test wheels, 1,907 AARX-3 wheels had been shipped to various railroads, making a total of 2,987 of these wheels shipped to date. The Griffin plant in Chicago was reported in full-time operation and this company's plant at St. Hyacinth, Can., which poured its first heat of 20 cast steel wheels on March 18, 1954, progressing toward a full-time production schedule.

The committee recommended removal from the Manual of six temporary standard steel wheels designs no longer needed; changed Spec. M-107, Sec. 9 to permit spectrographic ladle analysis in the case of multiple-wear wheels; secured four manufacturers' agreement to ⅜-in. radius on wheel hub fillet for gear-case fit; and included in one of its exhibits an outline of the best available technique for ultrasonic testing of new wroughts teel wheels for diesel locomotives.

Progress was reported, largely in test procedures, in the joint AAR, Wrought Steel Wheel Industry and Electro-Motive study of stresses imposed on wheels under diesel locomotives. The committee recommended a number of revisions in the Wheel and Axle manual for editorial correction and letter ballot action.

Axle and Crank Pin Research

The report on Axle and Crank Pin Research included a summary of investigations to date of broken and burned-off journals in interchange service. To determine the effect of previous overheatings, 225 instances were analyzed with few showing evidence of copper penetration. As of May 27, 1954 no case had been reported where a cold break was associated with either a previous overheating or copper penetration.

Reference was made to experimental axle tests on 11 passenger-car and 7 freight-car axle assemblies by the United States Steel Corporation at the Canton Laboratory. As a result of these tests, it was concluded that water quenching untreated axle forgings from 1,000 deg. F. does not improve resistance to initiation of fatigue cracks in the wheel fit portion, but does greatly increase the resistance to breaking off in the wheel fit if such cracks occur.

Fatigue tests of experimental raised wheel-seat axle with as forged (not machined) bodied indicated slightly greater fatigue life than the present AAR standard freight-car axle, but there is some evidence that machining the axle body between wheel seats has a beneficial effect on the fatigue resistance of axles.

Completion of all authorized laboratory fatigue tests of the AAR standard passenger car axle design was reported, covering Specification M-126-49, Grades G, H and G re-heated and water quenched from 1,100 deg. F. Data from these tests show that maximum allowable stress values for wheel seats of quenched and tempered Grade G and H axles in no case exceed the values obtained for non-heat treated axles. Wheel seats of Grades G and H axles have 45 per cent and 30 per cent, respectively, greater resistance to breaking off than normalized and tempered axles. Grade H wheel seats have 30 per cent greater resistance to initiation of fatigue cracks than normalized and tempered wheel seats.

One large railroad reported difficulty with AAR passenger roller-bearing design axles cracking between wheel seats when used in high speed service. An investigation was initiated to determine if this condition is confined to a single railroad and a sub-committee appointed to find out what instrumentation and tests will be required to establish the principal factors in this problem.

Passenger Car Specifications

This committee did not submit a report for 1952-1953 there being insufficient committee business.

Standard floor plans for six types of sleeping cars were discussed at a meeting held in March, 1954. This meeting was held jointly with the American Railway Car Institute's Committee on Passenger Car Design, consisting of representatives of the American Car and Foundry Company (now ACF Industries, Inc.), the Budd Company, the Pullman-Standard Car Manufacturing Company and the St. Louis Car Company. The joint committees were in agreement on a number of changes, additions and alternates which were not developed to the point where they could be included in this report. These plans will be submitted either in a separate report or included in next year's report.

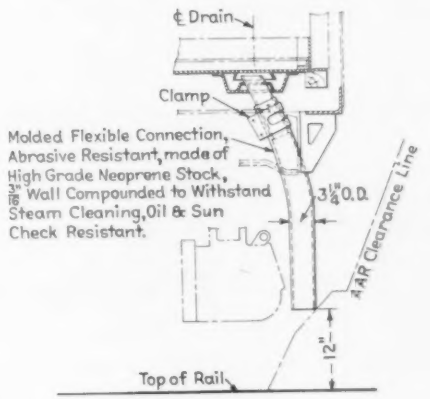
The committee did not feel justified in proceeding with two suggested items, one on repairs to metallic steam connectors, the other on overhead jumpers between passenger cars. It discussed subjects relating to electrical and air conditioning equipment but indicated that these items would be included in the reports of committees on those subjects.

Car Construction Details

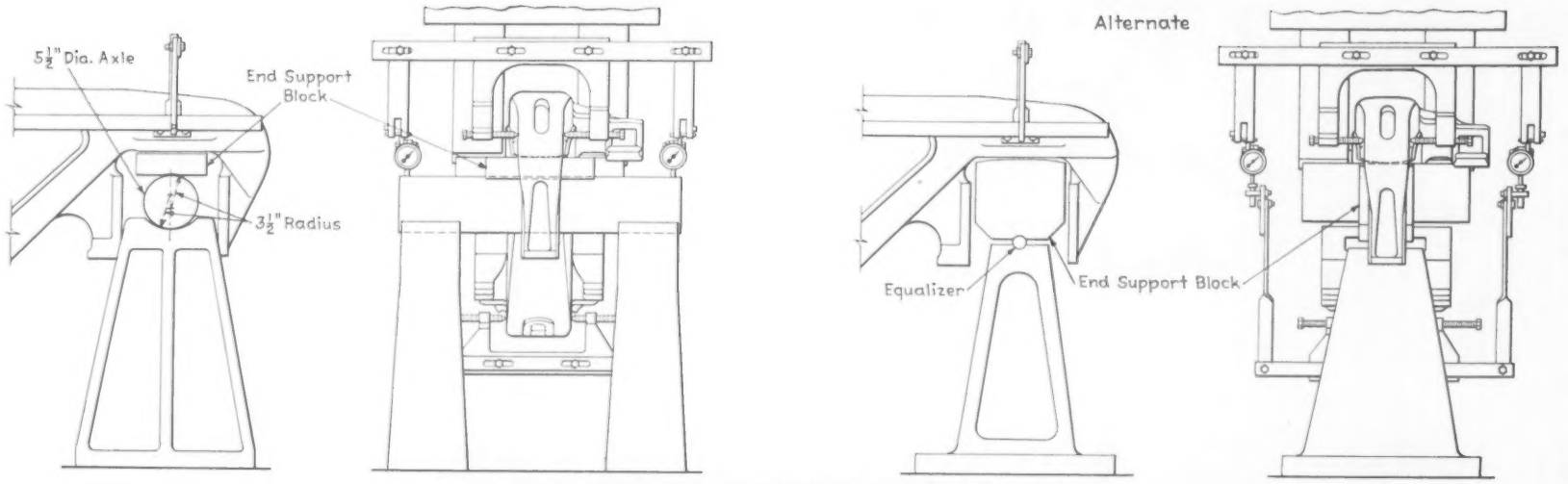
Nine letter-ballot items were submitted in the report of the Car Construction Committee:

Refrigerator Car Drippings

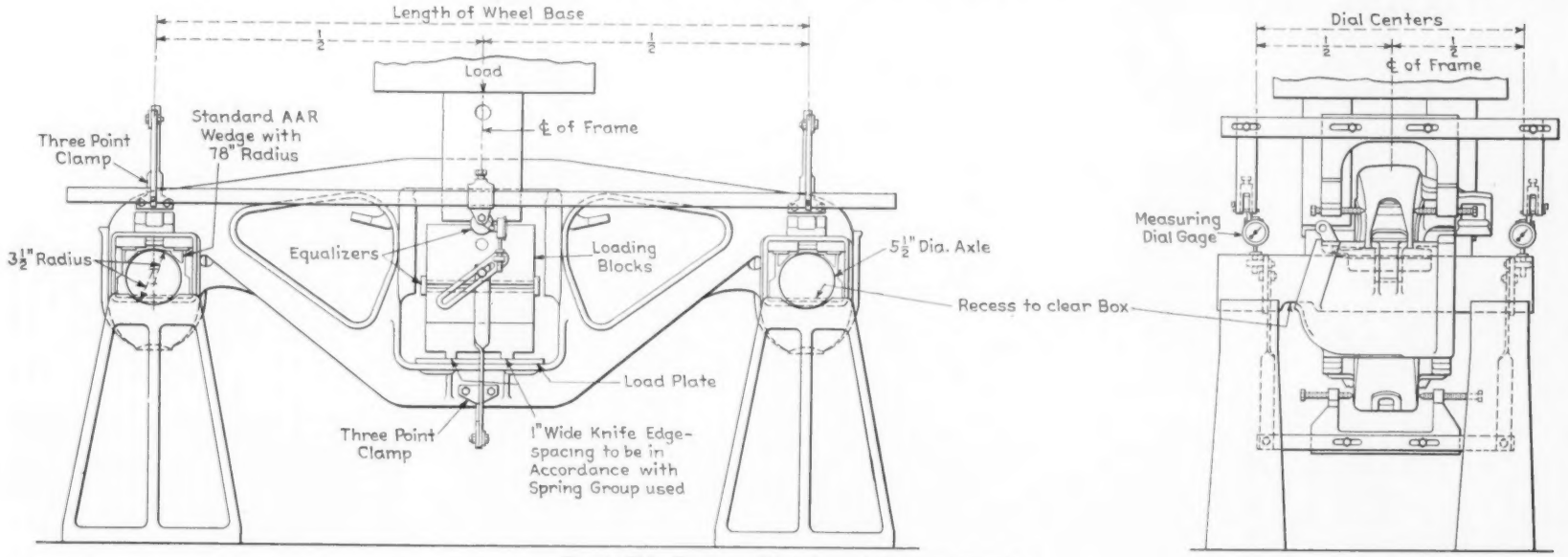
To dispose of water from the ice bunkers of refrigerator cars to keep it out of journal boxes, the committee considers the most practicable arrangement to be the use of the flexible drain connection shown in a drawing. It is low in initial cost and there



Proposed refrigerator-car drain extension.



Truck Side Frame with Pedestal Type Journal Boxes



Truck Side Frame with Integral Journal Boxes

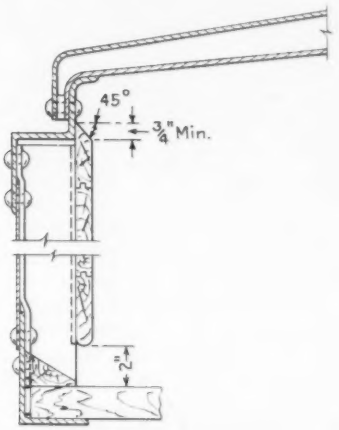
are no wearing parts either from the service use or vibration. It carries the drain-pan drippings down approximately even with the bottom of the journal box. For adoption as recommended practice and inclusion in the Manual.

Flat-Car Floor Width

To assist the lumber industry in preparing packaged units and to eliminate undesirable vacant space across flat cars, the committee proposes that all flat cars built new on or after January 1, 1956, shall have a uniform width of 9 ft 4 in. between inside stake pockets. For inclusion in the Manual.

Grain Behind Box-Car Lining

It is proposed that the present standard arrangement of box-car lining to provide for self clearance of grain behind the side lining be eliminated and replaced with an arrangement shown



Vertical Section

The proposed application of side lining boards in box cars to prevent grain accumulation behind the lining.

on one of the drawings. This provides for a 2-in. clear opening under the bottom side board, permanent closure at the top of the side, with a 45-deg. chamfer along the top of the lining.

Design Tests for Pedestal Type Side Frames

At the present time the specifications for cast-steel truck side frames do not provide an approved method of supporting and loading pedestal jaw type truck side frames in design static tests required in connection with applications for approval. The drawing, page 62, shows test setups designed to equalize both the application of the load and the supports. For inclusion, in specification M-203-51.

Journal-Box Wear Gages

The committee proposes, for inclusion in the Manual, two gages—one for determining the limits of wear of the journal box hinge pin and the wedge seat in the ceiling of the box, and the other for determining the limit of wear of the hinge lug.—which were incorporated in Interchange Rule 24, in 1952. The latter gage is for use in frames manufactured prior to March 1, 1954.

Z-Section Center Sills

When the double-Z-section center sill was adopted as standard, one section weighing 72.4 lb per ft was available. There are now three additional sections: one 62.6 lb. per ft; one 82.4 lb per ft, and one 102.4 lb per ft. It is proposed that the dimensions of all four sections be included in the Manual with a change in the note on welding the center sills over the bolsters clarifying its intent.

Repairs to Steel Center Sills

The committee proposed an improvement in the method of repairing center sills broken in the area of the draft-key slot. The drawing which is included in Rule 22 and the Manual is revised as shown to use an angle web-plate reinforcement instead of a flat plate. A note is added to permit the omission of the bottom plate reinforcement of the Z-bar flange when the crack does not extend downward from the key slot.

Standard Stud and Cap Screws for Roller-Bearing Boxes

A standard list of sizes of cap screws and bolts to be used in the assembly of roller-bearing journal boxes has been agreed upon by a subcommittee of the Car Construction Committee of the Roller Bearing Manufacturers. For inclusion in the Manual.

Long-Travel Freight Car Truck Springs

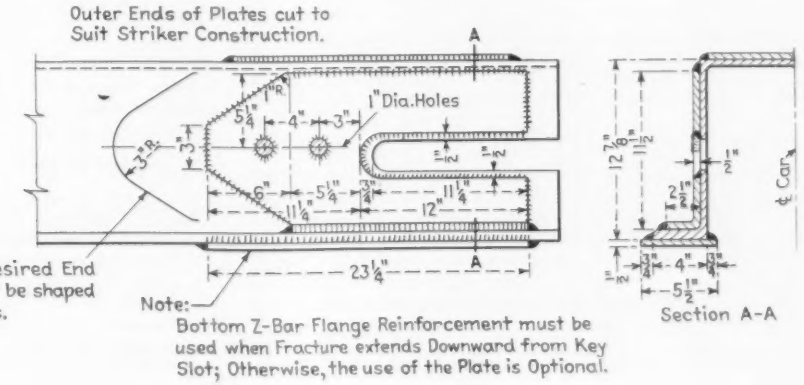
The committee proposes the addition of a paragraph to be added to Interchange Rule 3 to require truck springs of not less than 2½ in. travel and snubbing devices or built-in snubbing features on the trucks of all cars in interchange built new or rebuilt after January 1, 1956.

Other Business

Truck Castings—During the period April 1953 to April 1954 39 designs of truck side frames and 35 designs of truck bolsters were approved and assigned AAR identification numbers. A review during the year by the side frame and bolster manufactuers of their patterns has resulted so far in the elimination of 58 side frames and 72 bolsters identifications. The check is not yet complete. The committee also is seeking reports on all side-frame failures from the member roads, identified as to the maker and maker's pattern number.

Journal Boxes—The extensive use of journal-bearing packing retainers has made it necessary to establish more definite dimensions for the journal-box between the lid opening and the bottom. All of the pages in the Manual have been revised to establish the required manufacturing tolerances.

Covered Hopper Center of Gravity—A covered hopper car for the handling of flour and other bulk commodities, approval of which for general flour service was withheld by the committee last year anticipating a center of gravity of 87 in. above the



Proposed revision of the method of splicing and reinforcing center sills cracked through the area of the draft-key slot.

rail, has since had the restrictions removed. Tilt tests of the loaded car at Altoona disclosed that the center of gravity was 82 in., which is within the maximum of 84 in. recommended for unrestricted operation.

Arbitration Committee

During the year the committee decided Arbitration Cases 1844 and 1845.

Freight-Car Rules

The following are the principal changes in the freight-car interchange rules recommended by the committee:

RULE 2

Modification of the first paragraph of Section (b) Rule 2 to indicate that cars loaded with explosives and other dangerous articles for transportation by water must be handled in accordance with the United States Coast Guard regulations when applicable.

RULE 3

That effective dates for various requirements in Rule 3 for the following items, now set at Jan. 1, 1955, be extended to Jan. 1, 1956: Metal badge plates showing brake lever dimensions, braking ratio limits, the vertical clearance on top of coupler shanks and the prohibition of cast steel side frames having T, L or I sections.

Modification of Paragraph (c-12) of Rule 3 to provide for the use of new AAR Standard E-24 bottom articulated rotary locklift assembly.

Modification of Par. (f-2) of Rule 3 to provide necessary means for securing lading of flat cars. Lading strap anchors will be required effective Jan. 1, 1956 on all flat cars built new or rebuilt since Jan. 1, 1940.

As recommended by the car and locomotive lubrication Committee and approved by the general committee, extension of the length of repacking periods (from 18 to 21 months before empty cars may be rejected) in Par. (j-3) of Rule 3. Similar three-month extensions of the various time limits under Rule 9 and 66 were also recommended, with the proposals for extensions under the three rules subject to approval by special letter ballot. The time limit extensions were recommended because tests have indicated that the longer time journal boxes are operated without disturbance, within reasonable limitations, the less likelihood there is for journals to overheat. Rule 66 was also amended to permit trimming of spread linings under certain conditions.

Two new paragraphs were added to Rule 3: (s-7) to require legibility of car initials and numbers for proper identification, and (t-l-c), to require improved snubbing devices or built-in snubbing features in trucks under new and rebuilt freight cars.

RULES 9 AND 84

Rules 9 and 84 were amended to indicate definitely the car owner's responsibility for rusted and pitted journals where neither overheated nor cut.

RULE 17

Two modifications to Rule 17, one to clarify the intent where bolts are substituted for rivets on certain safety appliances under handling line responsibility, and one to provide more equitable credit allonwance (reduced from 50 to 25%) for sliding chairs which fit only brake beams having round tension members. Rule 17 (also 88,101,104 and 122) was also amended to provide for the application of the new Waughmat Twin Cushion. WM-DC-5 draft gear, which has been approved. A new item was added to section 1A of Rule 101 to provide for the application of the new Cardwell type L-20-S draft gears, which have been approved.

RULES 18 AND 27

As recommended by other committees concerned modification of Par. (e-1) of Rule 18 to provide for the use of new AAR Standard "E-24" bottom articulated rotary locklift assembly; of Fig. 2, Rule 24, to conform with the revised figure to be inserted in the Manual; and the addition of a new Rule 27 to provide for periodic dismantling of geared hand brakes for internal inspection of concealed parts and correction of any improper conditions to eliminate failures and insure more efficient geared hand brakes in service.

RULE 58

Modification of Rule 58 to include the latest type of pressure retaining valves among the air brake parts for which the delivering line is responsible when missing. Rule 82 was re-worded to clarify the intent.

RULE 99

Modification of Par. (c-7) of Rule 98 to provide basis of charges and credits for experimental cast-steel wheels.

RULE 107

Elimination of Item 162 and modification of Item 163 of Rule 107 to combine the separate charges for re-weighing and stenciling cars.

RULE 112

Par. (d-9) of Section B of Rule 112 was dropped because another section of this rule does not permit rebuilt recognition of tank cars. Modification of note marked (*) under table of Par. 1, of Section D, will provide the same rate of depreciation on tank cars for corrosive commodities as those for non-corrosive materials if the tanks on the former are effectively protected with an inside lining or coating. Rule 113 was modified to redefine responsibility between car owner and delivering line for loss or damage to a car on a vessel not a subscriber to the AAR interchange agreement.

Passenger Car Rules

Only two passenger rules were recommended for modication. Effective dates for defect card receptacles, brake shoe spark shields, Pitt-type couplers, type H couplers and type H and F on class B cars under Rule 2 were postponed one year to January 1, 1956. A new paragraph was added to Rule 7 to provide the same protection for packing retainers as in the freight car code.

The committee did not feel that any of the modifications other than those mentioned in connection with Rules 3, 9 and 66 necessitated submission to letter ballot.

Why Repacking Intervals Were Lengthened

Behind the Arbitration Committee's recommendation to lenghten by three months the various intervals for repacking journal boxes were the following test results:

1. No serious increase in dirt or deterioration of the packing resulted from normal use.
2. For the first month after packing the percentage of hot boxes was 9.7%, after which the rate declined to 6.9% from 8 to 12 months.
3. New bearings produce greater operating friction and earlier oil film breakdown before the final stable bearing run-in condition is reached.
4. Both laboratory and road tests show that newly packed boxes have a greater tendency to produce thread risers and that a relatively high pressure force exists immediately after the waste is packed in the box and gradually decreases during run-in to a final lower stable value.

The committee realized that under this proposal journal bearings will not be removed for periodic inspection as frequently as before. However, the service life of bearings is expected to be increased because (1) the increase in zinc content has greatly decreased reduced the number of loose lining; and (2) the manufacturers have improved their production methods, all of which have improved the quality of new bearings now being produced.

The relaxing of Rule 66 to permit trimming spread linings resulted from a study which indicated that overheating a bearing and causing the lining metal to flow does not deteriorate the bearing qualities of the metal.

ELECTRICAL SECTION

Fig. 1—Type of locomotive on which a trial installation of aluminum bus bar was made.

Aluminum Rides the Rails

Two trial installations of aluminum conductors for wiring locomotives indicate they are practicable and may be better than copper

By M. W. Bellis and
N. J. Hochanadel

ALUMINUM in one form or another has been used to carry electric current since 1890. The advantage of its lightness led to its adoption by public utility companies for certain special applications. Weight is also an ever present problem with the locomotive designer. Every unnecessary pound he adds to a locomotive is a drain on its efficiency throughout its entire life. At various times aluminum has been used in the structural parts of locomotives; but until the present no serious effort has been made to use it for carrying current.

Advantages

Some time ago, the decision was reached to make a trial installation of aluminum bus bar on a diesel-electric locomotive. This was prompted by several advantages of aluminum over copper.

1. The supply of copper has been extremely critical at times in the past, and such conditions might recur in the future. Therefore, merely as a precautionary measure for experience, the use of aluminum bus bar and cable on a percentage of locomotives is justified.

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2. For a given current carrying capacity based on the same temperature rise, aluminum has less weight. For example, if aluminum is used instead of copper for the bus bar and cable on a standard 1,600 hp diesel-electric road locomotive unit, the weight is reduced 500 lb.

3. In very large cable sizes, such as are used on locomotives, aluminum is more economical than copper when applied at the same temperature rise.

The General Electric Company and the American Locomotive Company have cooperated in equipping two locomotives as experimental units. In both cases the railroads involved cheerfully gave all the aid necessary.

Material

An Erie locomotive, Fig. 1, was fitted with aluminum bus bars using very simple terminal preparations and standard hardware. This unit has been operating for over

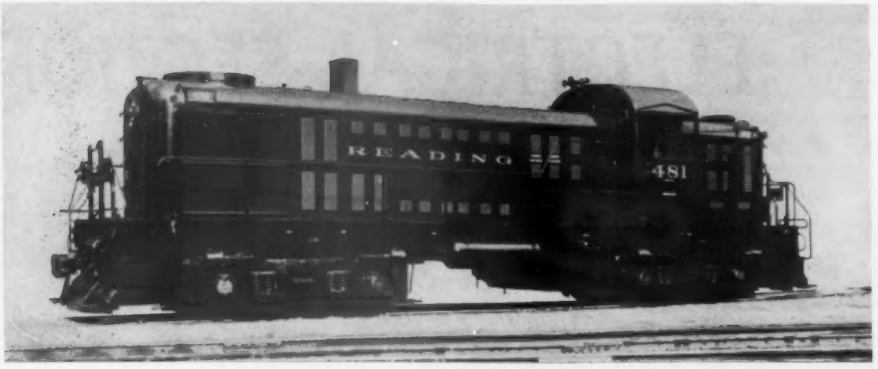


Fig. 2—Type of locomotive on which a trial installation of aluminum cable was made.

18 months. A recent check showed all bus bar joints and connections to be in as good condition as when the locomotive left the factory. In view of the many years of satisfactory service obtained from aluminum used in stationary applications, it is reasonable to expect proportionately good performance on locomotive installations.

Locomotive No. 450 of the Reading has been equipped with aluminum cable. This locomotive is a standard 1,600-hp diesel-electric road switcher similar to the one shown in Fig. 2, and is equipped with dynamic braking. The main wiring, consisting of 1925/24 copper cable (equivalent to 777,000 c.m.) was replaced with 1,000,000 circular mil aluminum cable. This was made up of 37 ropes, each rope having 19 strands of 0.038-in. half-hard aluminum wire, and was manufactured by the General Electric Company for locomotive service.

Past practice in diesel-electric locomotive wiring has been to use pressure-applied type terminals on cables. With aluminum cable, welded terminals would have a slight advantage in size. Very few railroads, however, are equipped to weld such terminals on their own property. Pressure-applied terminals were, therefore, chosen for this job, and selected so that they could be applied with the same tools as are used for copper terminals. The aluminum terminals are like the copper terminals which they replace except that they are electro-tinned and have two hex squeezes instead of one, as shown in Fig. 3. Two squeezes are used to cut down the unit pressure on the aluminum cable. The inside of the ferrules is coated with a special anti-oxidizing preparation. After stripping, the exposed end of the cable is given a light coating of the same chemical. The terminal is then applied and the squeeze made.

Installation

To avoid unnecessary complication and expense it is highly desirable that the aluminum cable be installed in the same conduit as formerly carried the copper cable. After some testing, it was found that this could be done, although the over-all diameter of the aluminum cable is 1.72 in., whereas that of the copper cable it replaced was 1.54 in. The aluminum cable is also somewhat stiffer than the copper, but still flexible enough to be installed in the same space formerly used for the copper. Some changes had to be made in the radius of bend where the cable came out of conduit and was joined to cleats. Workmen installing the aluminum cable remarked on its lightness and the ease with which it could be handled. Experience with this pilot installation indicates that, with proper

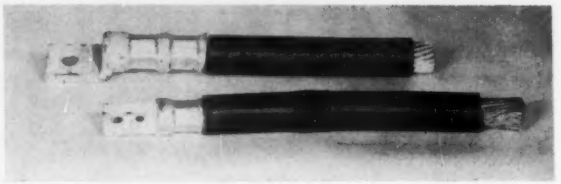


Fig. 3—Standard copper cable and terminal (below) compared with aluminum cable and terminal (above) which replaced it in trial installation.

planning, and the use of conduit suited to cable size, locomotives could easily be wired with this new type aluminum cable.

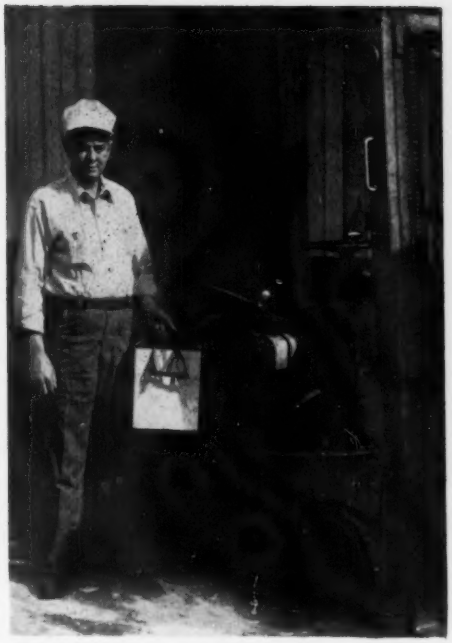
Where connections were made in the control compartment from the main cable to control devices, the longer aluminum cable terminals had some disadvantage. If future installations of aluminum cable are to be made, more room should be provided for the terminals. Nevertheless, the application in this particular locomotive proved to be successful.

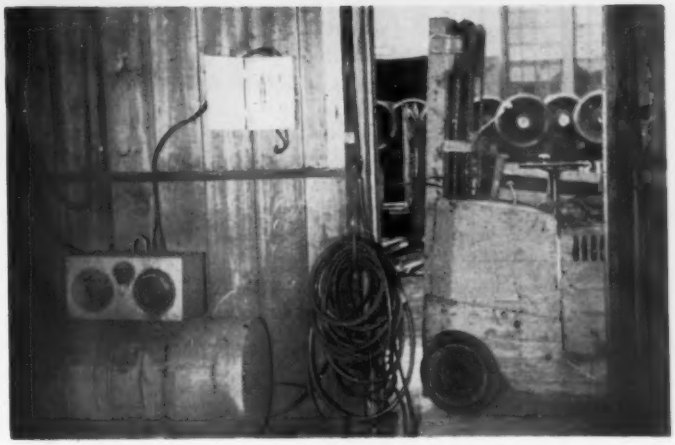
Test runs were made to determine the matching of the cable to the service demands of the GE-752 motor. Samples of the aluminum cable were subjected to cyclic runs of 1,300 amp. This current was applied for 2½ hours, cut off for one hour, and applied again for 2½ hours. Over 700 such cold to hot cycles were run to check mechanical joints of the cable to the terminal and the terminal to the copper lug. The matter of corrosion at terminals was also investigated. As a result, the terminals were electro-tinned to avoid any possibility of trouble from corrosion where connections were made to copper or silver-plated copper surfaces.

Conclusions

Experience gained from the installation and operation of the two pilot applications certainly indicates that aluminum cable and bus bars can be used on locomotives. Certain slight design modifications should be made to facilitate installation. Chief among these are increase in size of conduit and provision of additional space for terminals.

Aluminum has the advantages of availability and low weight. These appear to offset the disadvantage of larger size for a given capacity. Only continued operation in service will tell whether troubles may develop, but all indications up to the present point to a more widespread use of aluminum wiring in the future.





Above: An electrical worker with the meter case beside a truck which has just been put on charge. The voltmeter clip and dummy fuse are in front of the case.

Upper right: Operator adjusting the charging rate with the dummy fuse in place in the wall cabinet and the 100-amp. fuse removed.

Lower right: The truck battery is on charge with the 100-amp. fuse in place in the wall cabinet.

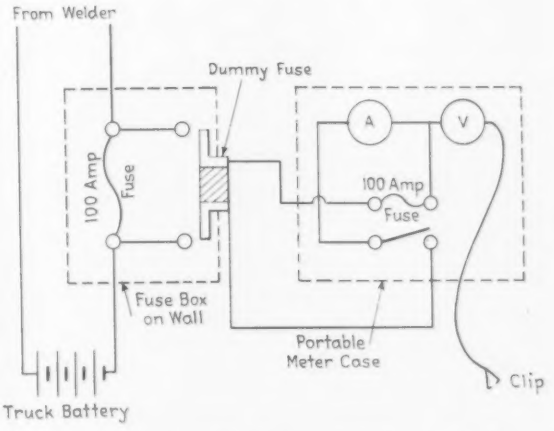
Welders Work Around the Clock

Some of the batteries of industrial trucks used in the Jacksonville, Fla., shops of the Seaboard Air Line are charged at night from the shop's welding sets. To accomplish this, each truck operator leaves his truck at the end of the day close to a shop welding or charging set which has been assigned to his truck.

At the same time, a qualified employee makes the rounds of the welding sets used for charging trucks. He carries with him a portable case which contains an ammeter, a voltmeter, a switch and a 100-amp. fuse.

On the wall back of the welding set is a small cabinet in which there are two fuse mounts connected in parallel. One terminal of the welding set is connected to the truck battery and the other is connected to the upper terminals of the two-fuse mounts in the wall cabinet. The two lower fuse-mount terminals are connected to the other terminal of the battery.

Leads from the ammeter in the meter case are brought out to each end of a dummy fuse which the operator plugs into one of the fuse clips in the wall cabinet. The voltmeter clip is attached to the other side of the welder circuit. Then with the switch in the meter cabinet open, the operator starts the welding set and brings the voltage up a little above the battery voltage. He then closes the switch in the meter case and adjusts the welding set current to that required for charging the battery.



Wiring diagram showing the arrangement of circuits in the meter case and between the welder and the battery.

With the battery on charge, the operator inserts a fuse into the other fuse mount in the wall cabinet and removes the dummy fuse from the other mount. It takes about three minutes to put a battery on charge and the operator then goes on with his meter case to the next welder location where another truck operator has left his truck.

The batteries used in some of the trucks are 32-volt Edison batteries and they are charged at a constant-current rate.

An Electrical Section Report . . .

Selection of Fluorescent Lamps

IT IS OFTEN DIFFICULT for the average user of fluorescent lamps to decide on the proper lamps to use in the various applications encountered in railroad work. As a guide in making the proper selection, information has been prepared by the Committee on Illumination of the Electrical Section, A. A. R., on the characteristics of the various lamps as to efficiency, color rendition and other qualities.

Fluorescent lamps are designed, the report states, to take into account three elements important in lighting effects—

(1) Efficiency—most light per dollar.

(2) Color rendition—ability to bring out the natural beauty of colored materials and peoples' complexions and

(3) Whiteness—their appearance in relation to natural daylight or traditional artificial illumination such as filament lamps.

The choice among fluorescent whites always involves compromise among these three elements. Obtaining best color rendition necessitates reduction in efficiency. Choice of whiteness affects both efficiency and color rendition.

Fluorescent lamps fall into two groups with regard to their efficiency and color-rendering properties. One, the standard white lamps, are designed to provide highest efficiency consistent with acceptable color rendition. The other, the de luxe white lamps, are designed to give colored materials the most natural and complimentary appearance, at reasonable efficiency.

Physically, the difference between standard and de luxe lamps is that the standard lamps emit relatively large amounts of yellow-green and orange radiations, but are weak in red and green. In the de luxe lamps, the spectrum is given better balance by the addition of red and green light to the output. The improvement in color rendition afforded by these additions results in reduction in luminous efficiency, since the human eye is less efficient in receiving the red energy than in receiving the yellow-green it replaces. However, even though de luxe white lamps give about 25 per cent less light than the standard white, the difference usually does not appear so great because of the increased vividness of color under de luxe lamps.

Experience indicates that two different degrees of whiteness are needed to allow fluorescent lamps to fit the requirements of a variety of applications. One white should be designed to help create a neutral to slightly blue (cool) atmosphere like natural out-of-doors daylight. The other should contribute toward the yellowish (warm) atmosphere usually associated with filament lamps. Accordingly, both standard and de luxe types are available in both warm and cool tints. Standard cool white and de luxe cool white lamps look alike but differ in their effect on the appearance of colored materials, and in efficiency. The same is true of standard warm white and de luxe warm white lamps. The accompanying table describes the color effects on these fluorescent lamps. Considering their characteristics with respect to application requirements, the following generalizations may be made.

De luxe fluorescent lamps are desirable in all public areas—coaches, diners, waiting rooms, lounges, restaurants, etc.—whenever the appearance of people and colors is important. The choice between de luxe warm white and de luxe cool white will depend on the type of atmosphere desired, level of illumination and decorative scheme of the area.

Standard fluorescent lamps are the logical choice in service, storage, shop and office areas, since the usual tasks here are non-color-critical and high lighting efficiency is of greatest value. The preference of most users is for standard cool white in these applications.

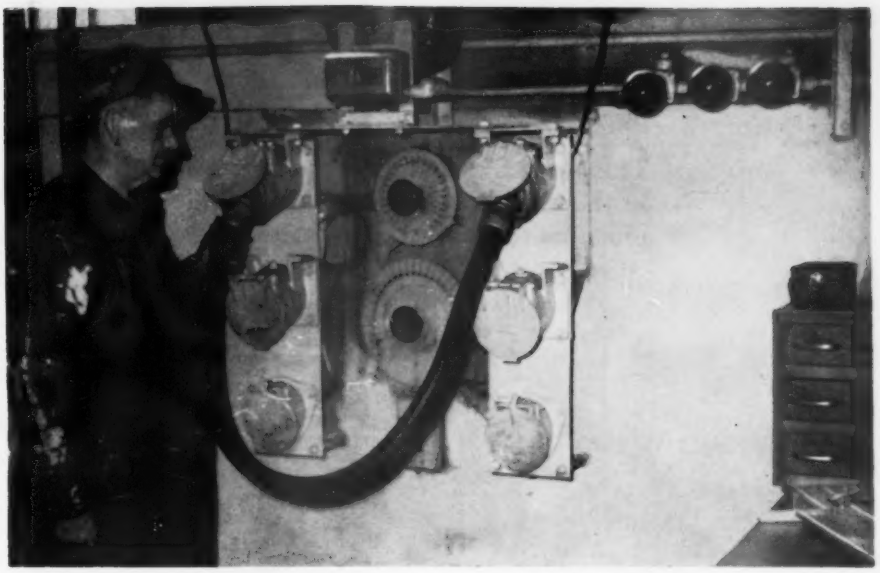
The older fluorescent whites—daylight, soft white, and white—are available primarily for replacement purposes in existing installations. Saturated colors of red, pink, gold, green and blue fluorescent lamps are also available for decorative effects.

COLOR EFFECTS OF FLUORESCENT LAMPS

	De Luxe Cool White	Standard Cool White	De Luxe Warm White	Standard Warm White
Lamp appearance*	White	White	Yellowish white	Yellowish white
Effect on atmosphere**	Neutral to moderately cool—like natural daylight	Neutral to moderately cool—like natural daylight	Warm—like filament lamps	Warm—like filament lamps
Appearance of people	Natural coloring, similar to effect of sun—pink skin	Reasonably good appearance—paler than with de luxe	Natural coloring, similar effect of filament lamps	Acceptable appearance—some tendency toward sallowness
Appearance of food	All types have good appearance—fresh, crisp appearance of green vegetables emphasized	Reasonably good appearance—reddish and brownish items rich looking	All types have good appearance—fried and baked goods especially complimented	Acceptable appearance—coffee, butter, eggs may have greenish cast
Effect on interior finishes	All colors emphasized nearly equally	Blue, blue-green, yellow-green, orange emphasized—reds are grayed	Red, orange, yellow, brown tan emphasized—blues tend to be grayed	Orange, yellow, yellow-green, emphasized—red, green, blue are grayed
Remarks	Best overall color rendition—simulates natural daylight	High efficiency—blends with natural	Excellent color rendition—simulates incandescent light	Highest efficiency white lamp—blends with incandescent light

*Depends on viewing conditions. In areas where considerable amount of natural daylight is present, appearance is as shown. At night, where appreciable amounts of incandescent lighting can also be seen warm white lamps appear white; cool white appears slightly bluish. Where once color of lamps is used exclusively, lamps will appear white, due to adaptation.

**For overall effect on room "atmosphere" warm white is usually preferred at levels of illumination below about 20 footcandles. At higher levels, either warm white or cool white may be satisfactory, but the usual preference is for cool white.



The panel which tests locomotive control jumpers under load current is the brain child of H. L. Dixon, shown with the panel.

Jumper Test for Short, Ground or Continuity Under Load

The arrangement for testing diesel locomotive control circuit jumpers shown in the illustration was developed in the Erie Shops at Marion, Ohio. The six receptacles on the test panel are arranged in pairs. The upper two have 27 contacts each, the center two have 21 contacts each, and the lower two 12 contacts each.

To test a jumper having 27 contacts, it is placed in the two upper receptacles as shown. The points on one of the dial switches connect to the 27 contacts in one of the receptacles and those of the other dial switch with the 27 contacts on the other receptacle. The secondary of the current transformer at the top of the panel is connected between the centers of the two dial switches. The three lights shown at the right are connected in series with the primary of the current transformer. The lamps themselves are 200-watt lamps, connected in parallel with each other. Power supplied to the primary is 120 volts a.c. With the jumper under test in position as shown, and with each of the dial switches on its No. 1 contact, a current of 28 amp. will flow through the No. 1 lead, and the three lamps in the primary will glow. Then by moving the switches to all of their corresponding contacts, each lead is tested under load in sequence.

By putting one dial on one lead, and swinging the other dial over all contacts, a test is made for possible shorts between leads. There is also a switch which connects one side of the transformer secondary with ground. Then by rotating either dial switch, a test is made to find a possible ground on any lead. The cable is worked by hand while the tests are being made.

To show how good a job the boys did in the shop, a diesel-electric locomotive is rolled out into the yard and put up against a load resistor at the North Billerica, Mass., shops on the Boston & Maine.

From Fuel Rack to Coupler

The story of what happens to power as it is developed in the engine and passed on its way to the coupler emphasizes the importance of good wheel-to-rail adhesion

M. C. Swanson

D. W. McLaughlin

By M. C. Swanson and D. W. McLaughlin

THE NET HORSEPOWER which appears at the end of the crankshaft of a diesel engine is the result of the horsepower produced in the cylinders, minus the horsepower necessary to overcome internal friction and to drive the water, lubricating oil and fuel pumps.

The relationship between the fuel rack setting and the resulting horsepower versus engine rpm is shown in Fig. 1 for the Alco 9 x 10½ engine. The contour of the fuel rack setting curve with respect to rpm quite closely establishes the contour of the torque versus rpm curve. If it were not for a slight falling off of fuel pump volumetric efficiency with increase in fuel pump strokes per minute and slight changes in combustion efficiency, it could have been said that torque was directly proportional to the fuel quantity per stroke.

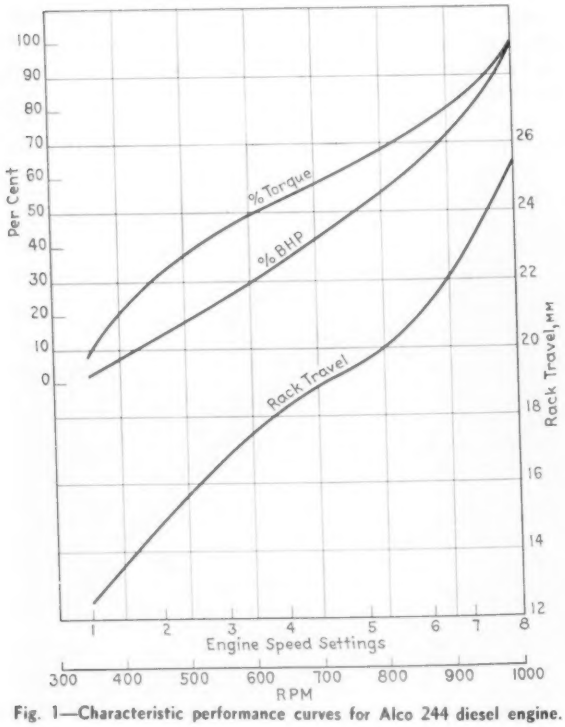


Fig. 1—Characteristic performance curves for Alco 244 diesel engine.

The relationship of the fuel rack curve to rpm,—and also the torque curve,—is not something necessarily fixed by the engine. The slope of this curve merely represents the judgment of the engineers at the time the engine loading versus rpm schedule was originally decided upon. The fuel curve,—and the torque curve,—possibly could have been flat down to some certain rpm and then slope downward. This would change the hp curve accordingly.

Generator

The generator represents the load on the engine; the traction motors are the load on the generator.

The generator charactistic consists of three portions; first, that in which there is a limit on the generator current; second, a limit on horsepower; and third, the limit on voltage.

The limited current portion is the result of a need and advantage of protecting the generator and motors from excessive current and to control maximum tractive force. The current limit is set to keep the maximum tractive force from going beyond 32 or 33 per cent adhesion or, in other words, 32 or 33 per cent of the weight of the locomotive.

Mr. Swanson is associated with American Locomotive Company, Schenectady, N.Y. and Mr. McLaughlin is with General Electric Company, Schenectady.

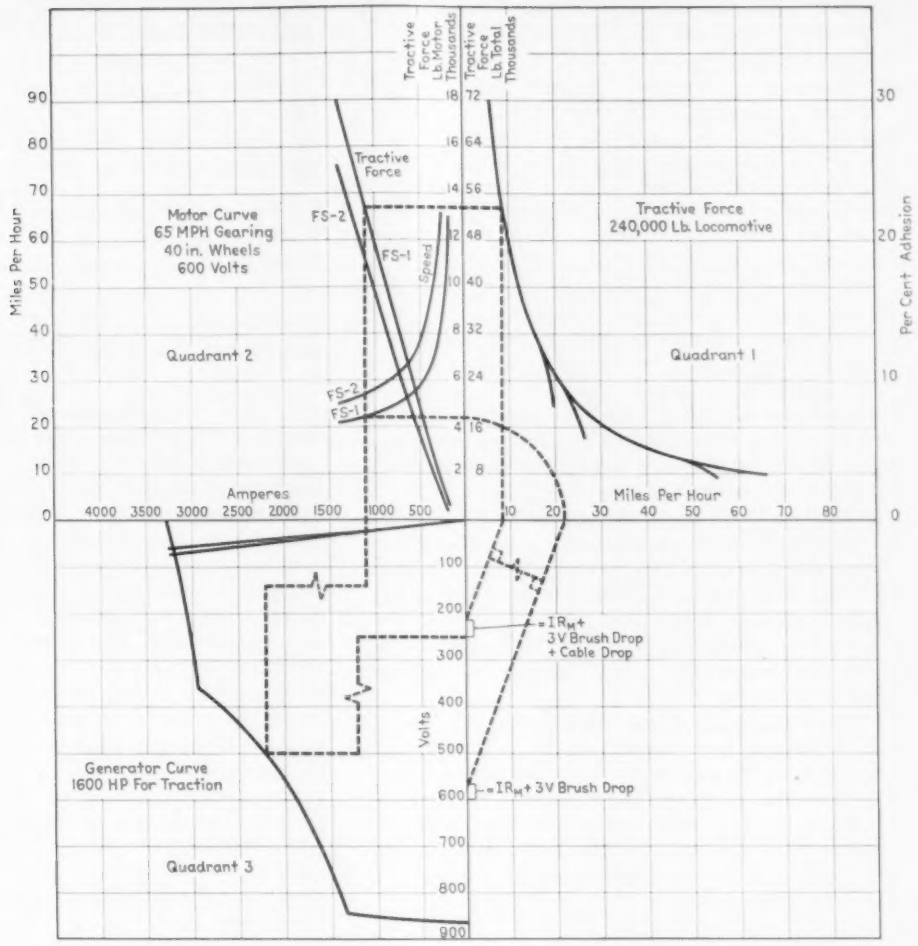
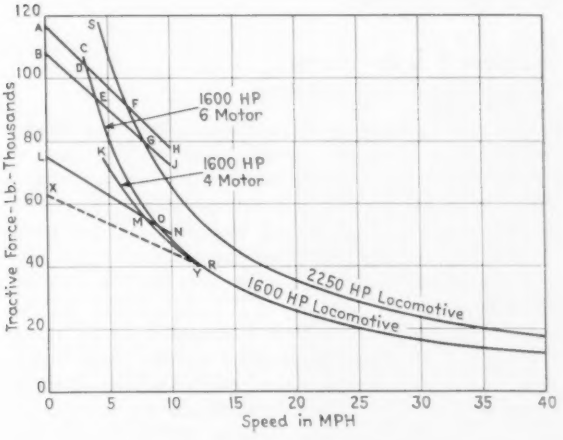


Fig. 2—Chart showing how the tractive force characteristic is obtained from the generator and motor characteristics.

Fig. 3 (below)—Relation of tractive force to spread for 2,250- and 1,600-hp locomotives.



The limited voltage portion is to limit maximum generator voltage or bar-to-bar commutator voltage difference, and to limit field coil heating.

The constant horsepower portion is for the purpose of having full rated horsepower available over as wide a range of current and locomotive speed as possible,—within the limits of varying generator and motor efficiency,—because the traction motors represent a load the resistance of which,—or more correctly the back electromotive force of which,—varies with locomotive speed.

Speed-Tractive Force Characteristic

The generator characteristic is plotted in third quadrant of the graphical construction shown in Fig. 2. This construction is illustrated for the purpose of showing how the tractive force characteristic is obtained from the generator and motor characteristics. A line has been drawn from the 2,200-amp point on the generator characteristic to the 1,100-amp point on the motor full-field (*FS-1*), tractive force versus current characteristic in *quadrant II*. Because of the *2S-2P* (two in series, two in parallel) motor grouping, one-half of the generator current (1,100 amp) is available to each motor. From this point on the motor characteristic, a horizontal line is extended into *Quadrant 1*.

The same 1,100-amp vertical line cuts the motor speed versus current full field characteristic (*FS-1*) at the 22 mph line. From this point, a horizontal line is drawn to the right-hand scale axis. With the graphical *O* point as a center, an arc should be struck to intercept the miles per hour scale for the first quadrant.

Inasmuch as the traction motor characteristic is based on 600 volts, the 600-volt point on the generator scale is used as a reference from which must be subtracted

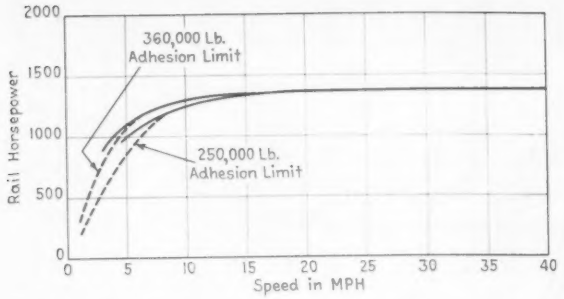


Fig. 4—Rail horsepower-speed curve for a 1,600-hp locomotive.

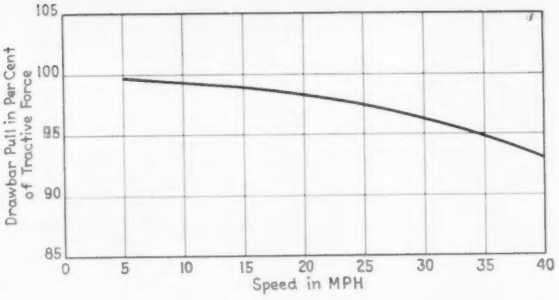


Fig. 5—Drawbar pull in per cent of tractive force vs. speed in mph for a 1,600-hp, 4-motor locomotive.

the motor IR_m drop plus 3 volts brush drop. From this remainder on the generator voltage scale, a construction line should be drawn to the previously marked-off point in the mph scale.

The 2,200-amp load point on the generator characteristic results in 500 volts potential which for two motors in series (2S-2P connection assumed) results in 250 volts across each motor. Allowing for the same motor IR drop, three volts brush drop, plus the drop in the cables, a point corresponding to about 215 volts should be noted on the generator voltage scale as the voltage effective at the motor.

A line should then be drawn through this latter point parallel to the previous construction line noting the resulting point on the mph scale. From this point, a vertical line can then be drawn to the point of intersection with the previously drawn horizontal line. This represents the first point on the speed-tractive force characteristic.

This process should be repeated at intervals across the full horsepower portion, (the curved portion), of the generator characteristic as the locomotive speed increases until the voltage limit portion, (straight portion at the higher voltages), of the generator characteristic is reached.

At this time, the transition relay should close the field shunt contactors, after which the process is repeated using the *FS-2* (motor shuntfield) motor characteristic. When motor field shunting takes place, the motor will draw more current and therefore increase the current load in the generator.

When the voltage limit portion of the generator characteristic has been reached a second time, the transition relay should again operate to transfer the motors to the parallel grouping. Under this condition full generator voltage minus motor IR_m brush and cable voltage drops will appear at the motors. This is accomplished by drawing the generator voltage line horizontal to the generator voltage scale instead of the half generator voltage line as done previously.

By expanding the graphical construction into the voltage and current limit portions of the generator characteristic (the straight portion at the high voltage and high current end), the departure from full horsepower on the tractive force-speed characteristic can be shown, should the locomotive overrun the transition points without transition taking place to the next higher or lower motor grouping or field shunt position.

Also, when the locomotive starts in the current limit portion, (8th controller notch from a standstill), of the generator characteristic at the point of intersection with the motor standstill resistance line, the graphical construction will indicate a sudden drop off in the *S-TF* characteristic which represents controlled or limited tractive force at about the 32 per cent adhesion level.

When the locomotive reaches the last motor grouping and field shunt combination at high speed, it is intended that the motor current demand on the generator should not drop into the voltage limit portion of the generator characteristic, and result in engine unloading. Road and road-switcher locomotives generally keep within the full horsepower portions of the generator characteristic, resulting in full utilization of engine horsepower across the entire speed range within the limitations of variable motor and generator efficiency with respect to the current load.

The generator and motor efficiencies vary with the current. Therefore, it is theoretically impossible to attain a tractive force characteristic which represents constant tractive horsepower. Sometimes for convenience and simplicity the tractive force curve is shown as a constant horsepower curve (a hyperbola). While the tractive force curve departs from full utilization because of changing motor and generator efficiency, the engine loading will remain constant.

Available Tractive Force Vs. Useable Tractive Force

Figure 3 illustrates tractive force curves for 1,600-hp and 2,250-hp diesel-electric locomotives. The tractive force values shown on the curves have been calculated by the method just described. Incorporated in the curves are the previously mentioned limitations of generator current, engine horsepower and generator voltage. These are known limitations, and are therefore controlled by design features.

Any value of tractive force represented by the curve C-P might best be called available tractive force. Available tractive force is not necessarily useable tractive force because certain limitations, which cannot be completely controlled by design features, are imposed by the adhesion characteristics of the locomotive.

Maximum useable tractive force, at any given speed, is the maximum tractive force which can be used to turn the locomotive's wheels without causing them to slip. In the case of 1,600-hp, 4-motor or 2,250-hp., 6-motor locomotives with 60,000-65,000 lb. axle loading, useable tractive force is generally lower than the available tractive force at speeds below 10 to 12 mph, i.e., the locomotive usually can slip its wheels because its

available tractive force is high enough to overcome the friction which exists in the contact area between wheels and rails. At higher speeds, the available tractive force usually does not exceed the locomotive's maximum adhesion characteristic.

The value of tractive force which can be put to use is therefore dependent upon the adhesion limitation characteristic of the locomotive.

At zero speed, the maximum tractive force which can be exerted by a locomotive without slipping its wheels may be equal to approximately 30 per cent of its weight on drivers. This is generally stated as 30 per cent adhesion. Because of track irregularities and other factors, the wheels of a moving locomotive do not maintain as good a frictional contact with the rail as do those of a standing locomotive. Consequently, as speed increases, the locomotive is unable to continue exerting maximum adhesion. At 5 mph, approximately 25 per cent adhesion can be maintained; at 10 mph, it decreases to 20.

In Fig. 3, these adhesion limits have been imposed on the tractive force curves by line *B-J* for 360,000-lb locomotives, and by line *L-N* for 250,000-lb locomotives. That part of line *L-N* from *L* to *M*, limits the 250,000-lb locomotive's tractive force characteristic. This locomotive's useable tractive force curve thus becomes *L-M-P*, whereas its available curve, i.e., the tractive force it can actually develop, is represented by *K-P*. Likewise, the useable tractive force curve for the 360,000-lb locomotive is *B-E-P* rather than *C-P*.

In order to look at the adhesion limitation in terms of its effect on horsepower, the operating charactistic of the 1,600-hp, 250,000-lb locomotive at a speed of 5 mph can be considered. At 5 mph, the 250,000-lb. locomotive has available, as indicated on curve *K-P*, 72,000 lb. Its useable tractive force at 5 mph, as limited by adhesion line *L-N* however, is 62,500 lb. When these values are applied to the formula

$$(\text{Rail HP} = \frac{\text{TF} \times \text{S}}{375})$$

it becomes apparent that, although 960 rail hp is available, the adhesion limitation permits the use of only 834 rail hp. When operating within this part of the locomotive's speed range, the engineman would accomplish this limitation by means of a throttle reduction or possibly through use of some excitation limiting device such as a hump controller. His signal to initiate the limitation would be wheel slippage encountered when the locomotive exceeded 834 hp (62,500 lb tractive force).

Curve *S-T* has been included in Fig. 3 to illustrate the effect when more horsepower (2,250) is applied to the 360,000-lb locomotive. Line *B-J* remains as the adhesion limit line but the limiting portion *B-G* imposes a greater limitation on the 2,250-hp locomotive than did *B-E* on the 1,600-hp unit. Its useable tractive force curve *B-G-T* is similar to the *L-M-P* curve of the 1,600-hp, 4-motor unit previously mentioned.

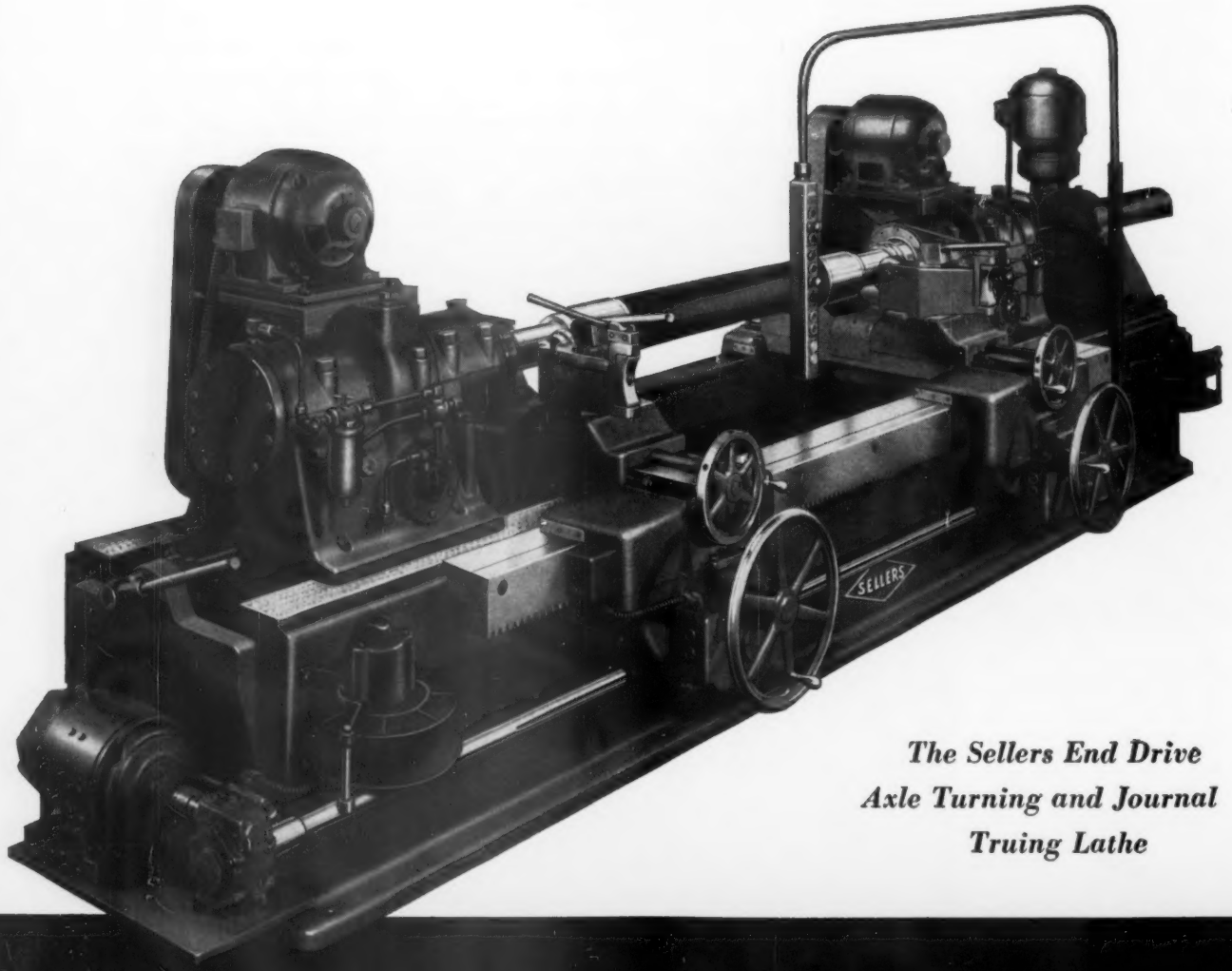
Increasing the weight on drivers of the 2,250-hp locomotive from 360,000 lb to 390,000 lb has the same effect as did increasing the weight of the 1,600-hp locomotive. That is, the new adhesion limitation line *A-H* and the new composite tractive force curve *A-F-T* result in more utilization of the tractive force curve.

Therefore, when the same value of diesel engine horsepower is applied to locomotives of different weights, the heavier locomotive will be less affected by adhesion limitation and, as result, will achieve greater utilization of its tractive force curve. With locomotives of the same weights, however, the application of greater horsepower reduces the utilization of the tractive force curve, and increases the effect of adhesion limitation.

The relationship between the engine, electric transmission and adhesion has been described for the purpose of clarifying the part each of the locomotive's propulsion system components play in the ultimate objective of moving the train. The last and probably most important requirement of the entire chain of events is the maintenance of wheel-to-rail adhesion.

TWO CARS TO CARRY ONE CIRCUIT BREAKER. A three-pole, oil circuit breaker loaded on two flat cars leaves the plant of the Westinghouse Electric Corporation at East Pittsburgh, Pa. Disassembled for shipment, the giant switch is rated 25,000,000 kva at 330,000 volts. It is the first of 35 such breakers to be used on a new 330-kv power system in the Portsmouth, Ohio area.

TWO . . .



The Sellers End Drive
Axle Turning and Journal
Truing Lathe

CONSOLIDATED MACHINE TOOL

Wholly owned subsidiary of Farrel-

. . . *for* ONE !

If you are turning and burnishing axles on old style axle lathes, you are probably getting 8 to 10 axles per machine in eight hours.

If you had the Sellers End Drive Axle Lathe in your shop, you could turn and burnish *twice that many* in eight hours.

CORPORATION, ROCHESTER, N. Y.

Birmingham Company, Incorporated

Questions and Answers

Interchange Rules

This is the ninth installment of a series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs to, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirements of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, come from a background of intimate association with the application of the rules. Obviously, comments or opinions as of today, may be inapplicable after a revision of the rules or further interpretations by the Arbitration Committee.

101-Q.—Is charge permissible for jacking and for lubrication of center plates in cases where liners are applied between top and bottom center plates of cars?
A.—In such cases it would be permissible to render charge versus the car owner for lubrication of center plates only, per Item 172 of Rule 101.

102-Q.—Where a pair of one-wear wrought-steel wheels is removed account one-wheel having flange cut, would it be proper to render charge versus car owner for such work?
A.—One-wear wrought-steel wheel having flange cut would be considered as an owner's defect under the provisions of Interchange Rule 43, provided no derailment or other unfair usage was involved.

103-Q.—Would the intent of Paragraph (12-a) of Interchange Rule 32 be violated in cases where contaminating commodities are loaded in box cars in first class condition with the exception of one or two broken floor boards or one or two broken lining boards?
A.—Yes.

104-Q.—Item 197 of Rule 107 mentions "removing residue of pitch, fuel oil, asphalt and similar commodities from tank cars . . ."; would lubricating oil be classified as being a similar commodity within the intent of this rule?
A.—Yes.

105-Q.—Is it proper to render charge versus car owner for renewal of approved packing retainer device, account broken, on opposite end of unit type truck in which wheels are exchanged account cut journal?
A.—Charge versus car owner in such cases would be proper if packing retainer devices were standard to car.

106-Q.—Is car owner or handling line responsible for freezing damage to water piping underneath passenger car caused by automatic dump valve being defective and becoming frozen?
A.—Damage of this nature is the responsibility of the car owner.

107-Q—How should charges and credits be handled where new cast iron wheels are applied and multiple-wear wrought-steel wheels are removed from a car stenciled "one-wear wheels new standard"?
A.—The car owner is entitled to defect card for labor only and the associated material, such as journal bearings, and dust guards. The repairing road should reduce charge for new cast iron wheels applied to secondhand value, per Interpretation No. 4 to Rule 98.

108-Q.—Where multiple-wear wrought-steel wheels are changed account having previously been slid flat beyond the condemning limit, the flat spots having been built-up and covered over by welding, should expense involved be assumed by the handling line or by the car owner?
A.—The delivering line is responsible for the cost of changing slid flat wheels which have been temporarily and improperly repaired by built-up welding.

109-Q.—Would it be proper for receiving line to reject an open-top loaded car in interchange having high and wide load which did not carry so-called excessive dimension cards indicating the dimensions of such lading?
A.—The term "proper data" as used in Interpretation No. 4 to Rule 2 was not intended to include excessive dimension cards indicating dimensions of high and wide loads. It would not be proper for receiving road to reject cars in interchange merely because they do not carry such excessive dimension cards.

110-Q.—Where wrought-steel wheels are removed and same kind applied to car not stenciled for type of wheels standard thereto, should charge for wheels be confined to value of new cast-iron wheels, in cases of owner's responsibility and to secondhand value of cast-iron wheels in cases of handling line responsibility?
A.—It is intended that where wrought-steel wheels are applied and wrought-steel wheels are removed, car not being stenciled for kind of wheels standard to car, charge should not exceed value of new cast-iron wheels for owner's defects or secondhand value of cast-iron wheels for handling line defects. However, in the event repairing line renders charges in excess of the above, it then becomes necessary for car owner to support claim by joint evidence.

General Motors

Diesel-Electric Locomotives

This is a new series of Questions and Answers pertaining to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

G33-Q—How is STOP obtained and what does it complish?
A—STOP can be obtained by depressing the emergency stop button on the end of the throttle lever and pushing the lever one step beyond the idle position. This stops all engines.

G34-Q—Where is IDLE position?
A—Idle position is as far forward as the throttle lever can be moved without depressing the emergency stop button.

(Continued on page 78)

DEPENDABLE

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G35-Q—What is the purpose of the running notches and can the throttle be opened several notches at a time?
A—Each running notch on the throttle increased the engine speed 75 rpm from 275 rpm at idle to 800 rpm at full throttle. Mechanical interlocks prevent the throttle from being opened more than one notch at a time.

G36-Q—What is the reason for this arrangement?
A—This is done to prevent rough train handling.

G37-Q—Does the same arrangement exist when moving throttle lever towards closed position?
A—No. The throttle may be closed completely with one motion in an emergency, but should be closed only one notch at a time in normal operation.

G38-Q—How does the reverse lever function and what are its positions?
A—Functions to control the direction of locomotive movement and its positions are: FORWARD, REVERSE and NEUTRAL.

G39-Q—What control is exercised in NEUTRAL position?
A—With the reverse lever in NEUTRAL position, the power circuits will not close when the throttle is opened.

Reverse Lever

Manual 2310—page 104

G-40-Q—When may the reverse lever be removed?
A—The reverse lever can be removed from the control stand only from neutral position, provided the throttle is in IDLE and transition lever in OFF position.

G41-Q—Explain how movement of the reverse lever to either FORWARD or REVERSE position operates to control the direction of locomotive movement.

Manual 2310—page 304

A—Movement of the reverse lever to either of these positions causes a magnet valve in the reverser to be energized. When either of the magnet valves is energized it allows control air to pass through the valve, moving the reverser to the desired direction.

Transition

Manual 2310—page 305

G42-Q—What is the meaning of the term "transition" as applied to diesel electric locomotives?
A—This term is applied to the changing of traction motor connections so that full power may be obtained from the main generator within the range of its current and voltage limits.

G43-Q—How may this be explained in another way?
A—Transition is a method of adjusting the traction motor "back pressure" (counter-emf.) bucking the input of power from the main generator so that this back pressure will not become too high at higher speeds or too low at lower speeds.

G44-Q—With what type of transition have F7 and FP7 locomotives been equipped since Nov. 1950?

Manual 2310—page 104

A—Since that time they have been basically equipped with three-relay automatic transition.

G45-Q—Is there any provision made for manual transition on such locomotives?
A—No, transition is fully automatic.

G46-Q—What exception has been made to this rule?
A—A transition lever is now supplied with A units solely for the purpose of dynamic braking and/or effecting manual transition on older types not equipped with automatic transition.

G47-Q—How does the transition lever control throttle operation?
A—An interlock in the controller prevents the throttle from being opened unless the transition lever is in at least the No. 1 position.

G48-Q—What must be done when controlling a locomotive in which all units are operated with automatic transition?
A—The transition lever is placed in the No. 1 position and has no further control of transition.

G49-Q—How is the transition lever moved?
A—Lift as high as it will go, press firmly in the direction you desire to move the lever. Maintain the side pressure and lower the lever and it will slip into the next notch.

American Locomotive

Diesel-Electric Locomotives

This series of Questions and Answers pertaining to Alco diesel-electric locomotives with General Electric electrical equipment is a continuation of a series, the first of which was published in the October 1950 issue of Railway Mechanical & Electrical Engineer. The references to manuals and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

Camshaft Idler Gears and Brackets

(Manual TP-500 Page 501)

1085-Q.—What is the final operation?
A.—Remove bracket spacer on engine frame without bosses (12 cylinder engine). Bosses are welded integral to cylinder block No. 9 bearing saddle of 16-cylinder engines.

Disassembly

(Manual TP-500 Page 503)

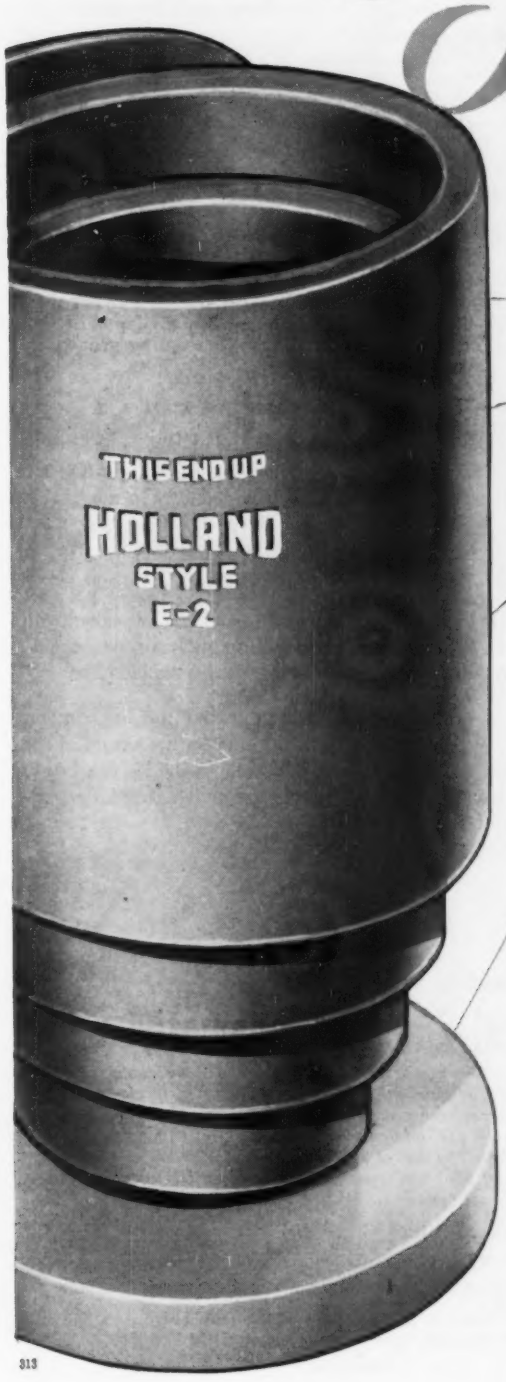
1086-Q.—What should be done when disassembling after removal?
A.—Remove cotter pin. Remove gear shaft nut. Remove gear shaft with idler gear shaft puller. Remove inner races of both bearings.

1087-Q.—How are the outer races removed?
A.—Push outer races about 1/8 in. out of brackets with gear hub while supporting bracket on a plate having a hole 4 in. in diameter.

1088-Q.—What should follow?
A.—Unlock and remove set screws. Brass dowels are

(Continued on page 82)

HOLLAND *Long-Travel* unit snubber spring



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Write for Bulletin #15 describing in detail the Unit Snubber.

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easily removed by unscrewing set screws. With bearings in position as described above, slide gears and retainers from bracket. Press out roller bearings from bracket.

Inspection and Maintenance

1089-Q.—What inspection should be made of the bearings?
A.—Inspect bearings for worn races and rollers.

1090-Q.—What other attention should be given this apparatus?
A.—Check fit of key in keyway. Inspect retainer seat for wear, and gear teeth for uneven or excessive wear.

Reassembly

1091-Q.—When reassembling, what should be done?
A.—Insert key in shaft keyway. Apply retainers in gear hub on each side of the gear.

1092-Q.—How does the retainer seat face?
A.—The retainer faces the hub of the gear.

1093-Q.—What should follow?
A.—Place gear with retainers in bracket, fasten retainers to bracket walls with set screws. Tighten and lock cap screws with brass dowels.

1094-Q.—What precaution must be taken when penning the dowels?
A.—After penning the dowels, be sure that all brass chips are removed to avoid the possibility of any getting into the bearings when applied.

1095-Q.—Describe the operation when assembling the roller bearings.
A.—Oil the bracket bearing housing and insert roller bearings. Press inner race on shaft.

1096-Q.—What precaution should be observed concerning the outer races?
A.—The numbers on the outer races should face in.

1097-Q.—From which side of the bracket should the shaft be pressed in?
A.—From the machine side of the bracket.

1098-Q.—What operation should follow?
A.—Press the second inner race on shaft to complete the bearing. Apply gear shaft nut. Apply cotter pin.

1099-Q.—What torque should be used when tightening the gear nut?
A.—150 ft-lb torque.

1100-Q.—What care should be taken with the bearings after assembly is complete?
A.—A careful check should be made to make sure that the bearings do not bind.

1101-Q.—What lubricant should be used when pressing the shaft in gear etc.?
A.—White lead should be used for such operations.

Installation

1102-Q.—What should be done initially for this operation?
A.—Place top ream bolt in position (one for each bracket) in the cylinder block.

1103-Q.—Describe the operation with engine cylinder block without bosses, (12-cylinder engine).
A.—Place ream bolt for bracket spacer in position, apply capscrew, washer and wire to spacer. Tap spacer ream bolt flush with surface of spacer so that idler gear bracket assembly may be positioned correctly. Apply idler gear bracket over top bolt and fasten nut. Tap spacer ream bolt through bottom hole of bracket, secure with nut.

(Manual TP-500 Page 505)

1104-Q.—Describe the installation further.
A.—Drive third ream bolt in position and pull up with nut. Tighten nuts, hold heads of lower two bolts with a socket wrench when tightening nuts.

1105-Q.—When are the split and idler gears meshed correctly?
A.—Blue teeth of split gear check if gears are meshed correctly.

1106-Q.—How is any misalignment corrected?
A.—By the use of shims on bracket spacer.

1107-Q.—How is backlash checked?
A.—Take backlash at 4 points of each idler gear. (See Table of Clearances).

1108-Q.—What must be done if backlash does not fall within the required limits?
A.—In this case apply another idler gear assembly.

1109-Q.—Describe the final operation for assembly.
A.—Apply cotter keys to castellated nuts or ream bolts. Apply piston and liner assemblies 6RR and 6L or 8R and 8L to frame.

Generator Adapter—Description

(Manual TP-500 Page 505)

1110-Q.—What does the generator adapter support?
A.—The traction generator, also the oil catcher.

1111-Q.—What is housed in the generator adapter?
A.—The general adapter houses the timing gear train.

(Manual TP-500 Page 506)

1112-Q.—What fixtures are mounted on the generator adapter?
A.—The tachometer generator and crankcase exhauster assemblies. Two of the four mounting pages for the engine generator are also provided by the adapter.

Removal

(Manual TP-500 Page 507)

1113-Q.—What is the first operation when about to remove the general adapter?
A.—Place the engine with generator attached, on blocks using the four mounting pads of the engine generator unit. Remove generator from adapter.

1114-Q.—What should be done next?
A.—Remove the two camshafts and the oil catcher, remove the castellated nuts, found on the inside of the base, from the two special dowels in the lower portion of the adapter. The dowels are pulled from the outside of the adapter.

Fairbanks-Morse

Diesel-Electric Locomotives

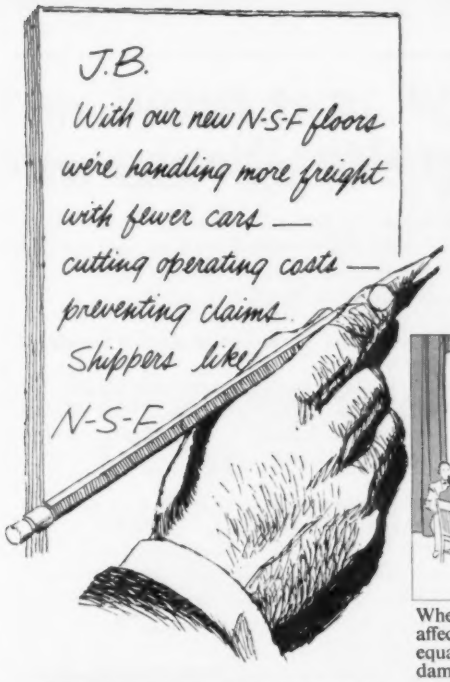
This is a new series of Questions and Answers pertaining to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

Throttle Control

F29-Q—What kinds of throttle control are used?
A—Electric control and pneumatic throttle control.

F30-Q—What is the purpose of the stop button on the end of the throttle lever (when so equipped)?

(Continued on page 82)



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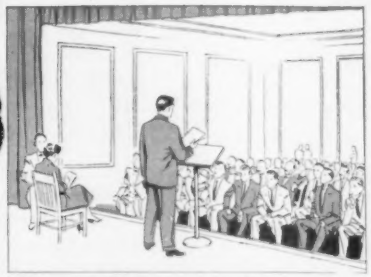
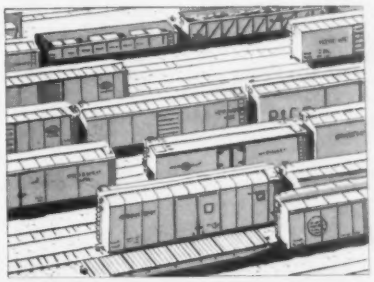


When traffic managers discuss matters affecting car supply, a recurring topic is inadequate flooring. Floor failures cause freight damage, limit use of mechanical equipment.



Seriousness of the problem, as Railroad Shippers' Advisory Boards point out, is reflected in the number of cars rejected by shippers as unsuitable for safe transportation of freight.

Railroads attempt to keep up floor care. But they're squeezed by rising labor costs, and loss of revenue during repairs. The positive solution: N-S-F—NAILABLE STEEL FLOORING.

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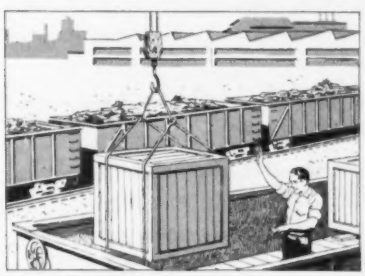

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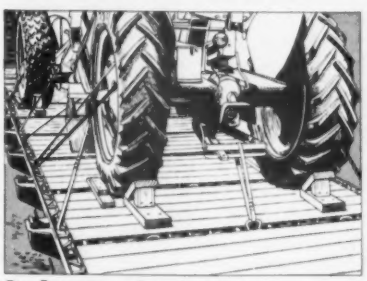

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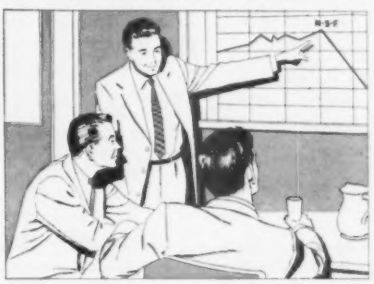

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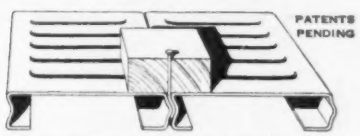

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54-SF-18

A—Pressing the STOP button and pushing the lever one notch beyond IDLE position shuts down all engines (except an engine that has been isolated).

Reverse Lever

F31-Q—Do all units have a reverse lever?

A—No. When equipped with pneumatic throttle control, there is no separate reverser.

F32-Q—What are the positions of the reverse lever?

A—FORWARD, OFF, and REVERSE.

F33-Q—What precaution must be taken with respect to the reverse lever?

A—NEVER MOVE REVERSE LEVER WHILE LOCOMOTIVE IS IN MOTION.

F34-Q—What harm can result from disregard of these instructions?

A—Moving the reverse lever with the locomotive in motion may cause serious flash over of traction motors and generator, causing considerable damage to electrical equipment.

Selector Lever

(Bulletin 1706—101-A, page 10)

F35-Q—Where is the selector lever and what is its function?

A—The selector lever is the top handle on the controller and is used to change traction motor circuits from motoring to dynamic braking and vice-versa.

F36-Q—For what other purpose is the selector used?

A—The selector is also used to control manual transition when necessary of tractor motor circuits on trailing units of different model or manufacture.

F37-Q—What are the selector handle positions?

A—4-3-2-1-OFF-BRAKE.

F38-Q—With what precautionary device is the selector equipped?

A—A latching device between 1 and BRAKE, so that movement between motoring and braking or vice versa cannot be made without lifting the latch each time.

F39-Q—In what position is normal operation?

A—Normal operation is in Position 1 when not in dynamic braking or operating with units of different model.

F40-Q—Is there any connection between the selector lever and automatic field shunting circuits of the locomotive?

A—No, only to train line wires in positions other than OFF or BRAKE.

Lever Interlocking

F41-Q—Due to interlocking of control stand levers, how is movement of the reverse lever controlled?

A—The reverse lever cannot be moved from forward to reverse unless the selector handle is in OFF, 1, or 4, and the throttle is in IDLE.

F42-Q—When can the reverse lever be removed?

A—The reverse lever cannot be removed unless the throttle is in IDLE and the selector lever in OFF.

F43-Q—Can the selector handle be moved from 1 to OFF position?

A—It cannot, unless the throttle handle is in IDLE.

F44-Q—How does interlocking with throttle handle control the movement of selector handle in Positions 1-2-3-4?

A—The selector handle can be moved through Positions 1-2-3-4 with the throttle handle in any position *except* that it cannot be moved from 2-3 or 3-2 unless the throttle is reduced to Notch 6 or below.

F45-Q—What governs the movement of selector handle for dynamic braking?

A—The selector handle cannot be moved into the dynamic braking range except when the throttle is in IDLE and the reverse handle in FORWARD or REVERSE.

F46-Q—How is the throttle handle controlled by the interlocking system?

A—The throttle handle cannot be moved from IDLE unless the selector handle is in Position 1 or above. It cannot be advanced with reverse handle removed, but can be advanced with the reverse handle inserted in FORWARD, REVERSE or OFF.

F47-Q—What other equipment is essential for locomotive control and operation?

A—Numerous breakers, fuses, and various other devices enter into the picture, however, as there is some variation on the different models, further description should appear under each model as described later.

F48-Q—What systems are incorporated on all units?

A—Fuel oil, lubricating oil, cooling, and train heating systems (when used).

Traction Motors

F49-Q—How are the traction motors connected and what is their function?

A—Traction motors are geared directly to the driving axle of each truck. Their purpose is to convert the electric power supplied by the main generator into mechanical power used in moving locomotive.

F50-Q—What device is used to cool the traction motors?

A—The traction motor blowers.

Consolidation Line Road Locomotive

(Bulletin 1706—101A, page 1)

F51-Q—What does this type of locomotive consist of?

A—This type locomotive consists of short uniformly built units, for road service, passenger and freight.

F52-Q—Can these units be operated in multiple?

A—Yes, with each other, with older models F-M road units (except in dynamic braking) or with certain units of other manufacture.

Trucks

F53-Q—How many trucks are used on freight units?

A—Freight units are equipped with two four-wheel trucks.

F54-Q—What is the truck arrangement on passenger units?

A—Passenger units use a leading four-wheel truck, two 4-wheel truck and a rear six-wheel truck.

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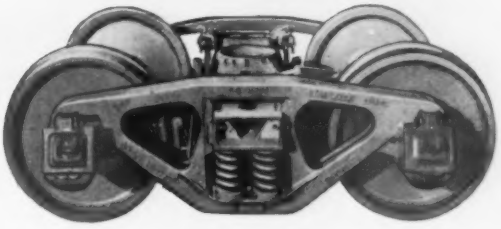

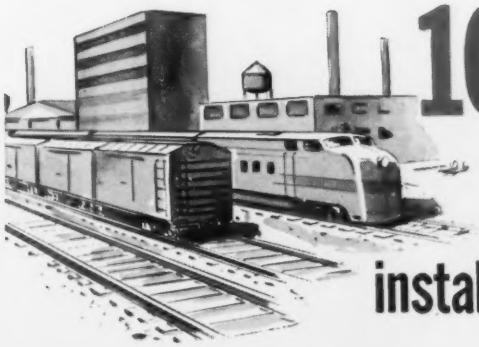

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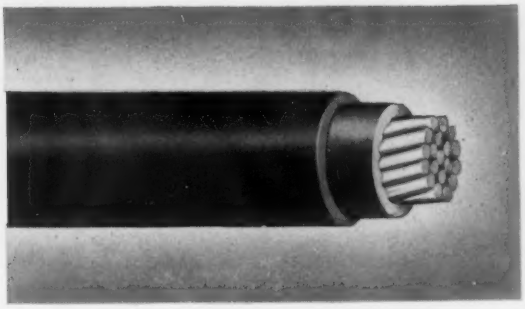

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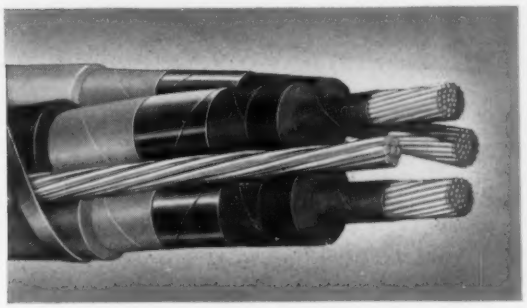

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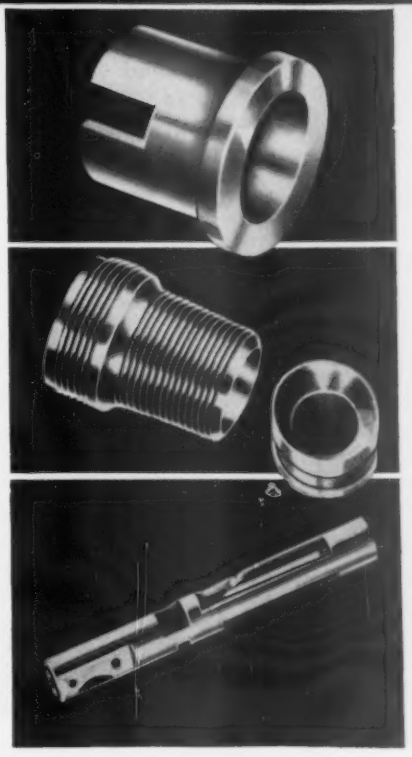

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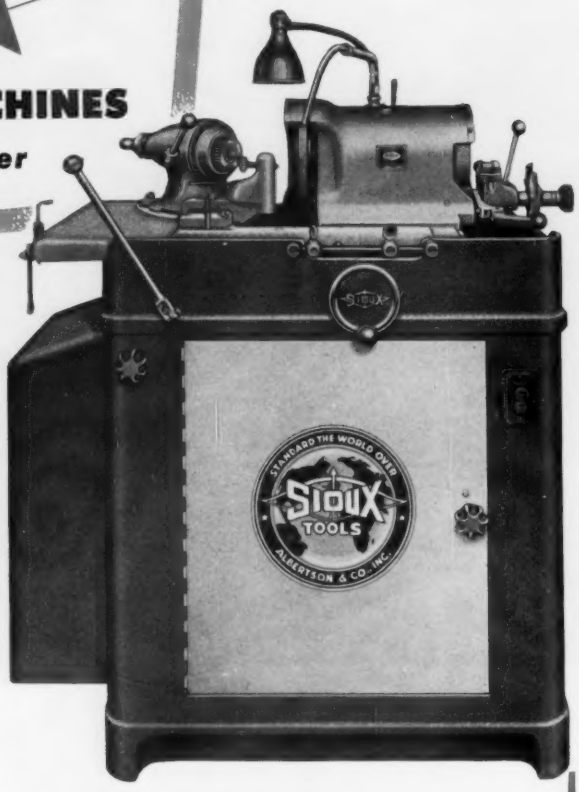
VALVE GRINDING MACHINES

Standard The World Over



The SIOUX No. 682 Valve Grinding Machine assures the ruggedness, and the precision needed to do those big jobs.

No. 682-L-Lever operated chucks. Capacity with two chucks, ¼″ to 1¼″ valve stems. Capacity 6½″ valve heads. Valves up to 18″ long with aligner, no limitation when chuck bushings are used.

- **Rigid grinding head ball bearing**
- **Permanently lubricated**
- **Removable coolant tank**
- **Self Priming Pump**
- **Automatic Chuck Stop**
- **From 15° to 90° chuck angle**

HEAVY DUTY VALVE SEAT GRINDER

Spline Drive For Large Engines

The "Basic" SIOUX Valve Seat Grinder Kit includes a Heavy Duty Driver, Dressing Tool, Holders, Spanner Wrench, Holder Clamp, Indicator, Pin, Special Lifting Springs, and Metal Box.

Photo at left taken in New York Central's Stanley Diesel Locomotive Shop, Toledo, Ohio, shows the Heavy Duty Driver, Holder and SIOUX Valve Seat Grinding Wheel grinding a diesel liner head valve seat.

WRITE FOR NEW CATALOG!

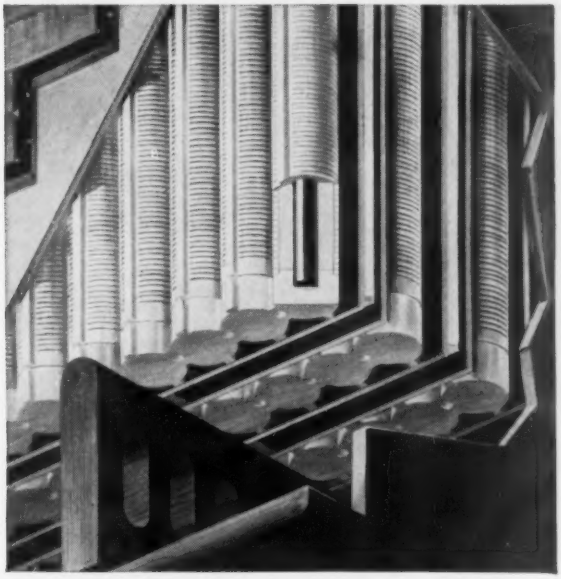
ALBERTSON & COMPANY, INC.

SIOUX CITY, IOWA, U.S.A.

KEEP YOUR PASSENGERS COOL AND HAPPY

. . . with powerful Exide-Ironclad batteries!

PASSENGERS LIKE the comforts of improved coach facilities. Good lighting and air-conditioning create goodwill and repeat business. When dependable Exide-Ironclad batteries are on the job your customers get the traveling comforts you are providing. Exides are built to withstand hard, continuous service. They give worry-free performance and maintain high, uniform voltage throughout long stops. Also, because of lower costs for operation, maintenance and depreciation Exide-Ironclad batteries are your best power buy . . . AT ANY PRICE!



THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, *giving longer working life*.

IMPROVED Exide-Ironclads now have power tubes made from *non-oxidizing* plastic for longest battery life. For full details, call your Exide sales engineer—write for Form 5010 (Installation and Maintenance of Car Lighting and Air Conditioning Batteries).

Your best power buy
. . . AT ANY PRICE!

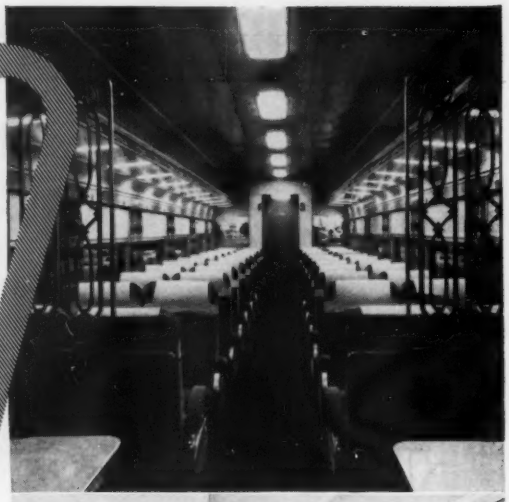
Exide®
IRONCLAD® BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

GAIN THESE ADVANTAGES with MET-L-WOOD

METAL BONDED TO PLYWOOD

for new and rebuilt Passenger Car Interiors



FAST ASSEMBLY with Met-L-Wood, whether you fabricate in your shops or use prefabricated Met-L-Wood panels made to your exact specifications.

LIGHT WEIGHT Met-L-Wood panels can reduce weight to as low as 27% of the weight of comparable steel construction.

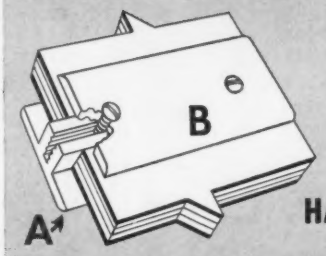
SOUND-DEADENING value of Met-L-Wood reduces outside noise levels, and is particularly valuable as sound-isolation when used for compartment partitions and doors.

VIBRATION DAMPING effect of Met-L-Wood helps prolong car life — gives passengers extra comfort.

and Smooth, Durable Beauty!

Whether plastic, painted steel, stainless steel, or aluminum, the smooth sweep of Met-L-Wood panels adds beauty to any car interior. Tough, abuse-resisting surfaces keep car interiors new-looking for years.

Details and technical data on Met-L-Wood panels, doors and partitions will be sent promptly on request.

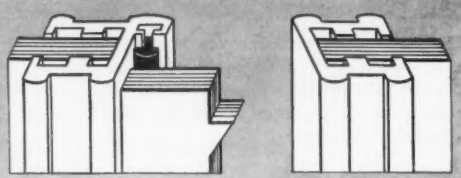


NEW PANEL JOINT HARDWARE

Met-L-Wood panels can now be joined faster and more easily with this new extruded aluminum hardware. Strip A has a grooved slot which provides strong threads for standard 10-24 machine screws anywhere along its length. Strip B can be drilled for screws at convenient points along the panel joint.

PANEL EDGE FITTINGS

Extruded aluminum fittings for Met-L-Wood panel edges improve partition and door appearance and give permanent edge protection. Left below is the fitting for door stops. Keyed slot holds molded rubber bumper firmly and permanently. At right is edge fitting for sliding doors and partition edges. Both fittings are easy to install on Met-L-Wood panels.



Write for Bulletins 520 and 521

MET-L-WOOD CORPORATION

6755 West 65th Street, Chicago 38, Illinois

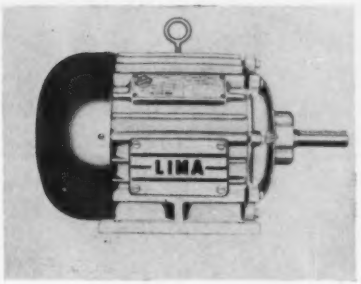
NEW DEVICES

(Continued from page 19)

moving parts to a minimum. The device is light in weight and compact. It will thread a pipe projecting through a wall as short as 6¼-in. Dies recede along tapered steps to maintain accuracy in cutting threads.

Toledo Pipe Threading Machine Company, Toledo.

■

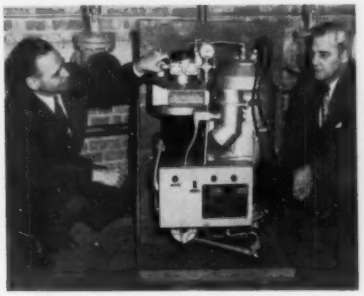


Motors for Hazardous Locations

Lima Electric Motor Vompany, is offering a new Type EX explosion-proof motor and a Type ED dust-tight motor. The Type EX is designed for use in hazardous locations where gasoline, petroleum, naptha, alcohols, acetone, lacquer solvent vapors and natural gas are present. The Type EX is a totally enclosed, fan-cooled, explosion-proof, motor for Class I Group D Service. The Type ED is designed for use where hazardous grain dust, carbon, coal or coke dusts exist. The Type ED is totally enclosed, fan-cooled and dust-tight. Both motors are manufactured in ratings of ¾ hp. to 20 hp. in NEMA frame sizes 224 to 326 inclusive, for operation on 2 or 3 phase, all commercial frequencies and voltages below 600.

The design of the Lima motor frame, incorporating deep, integrally cast fins, provides extra cooling surface for rapid heat dissipation without increasing the diameter of the motor frame. At the same time, the new design has no corners or pockets and no concealed air passages that can become clogged and retard cooling. A specially designed external fan forces air at high velocity over the outside of the motor. The deep-drawn steel fan housing gives proper direction to this air stream resulting in a motor which, the maker states, blows itself clean continuously. If desired, under extreme conditions of dirt or silt, a broom may be used to remove heavy deposits, as all motor cooling surfaces are exposed and readily accessible.

The Lincoln Electric Company, Cleveland, Ohio.

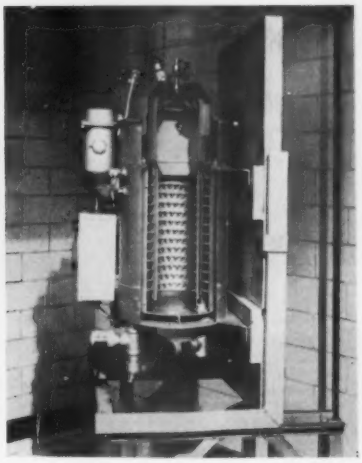


Standby Heater for Diesel Locomotives

The Vapor Heating Corporation has made some improvements to the No. 4915 (Watchman) water heater that keeps engines and lubricating oil warm overnight or between runs when the locomotives are not being used.

One of the improvements is the addition of a motor that can operate either off the locomotive's batteries or off 110-volt ac from an outlet along the track in the yards. This eliminates running down the batteries to operate the heater. In fact, when operating from the ac outlet the batteries may be charged at the same time. Under such conditions the dc end of the motor becomes a generator and supplies dc power to operate the controls and give a 4 or 5 amp trickle charge to the batteries at 74 volts dc.

Other changes include improvements in the combustion chamber and incorporating the circulating water pump onto the heater with a direct shaft drive from the motor, which makes the whole unit a more compact package easier to install in limited spaces on diesel locomotives.



The heater is started by pushing one button, then automatic thermostat controls take over causing the fire to light up as needed to keep the coolant water at the desired temperature (this may be set between 140 and 190 deg). Circulation of the coolant is continuous whether the fire is on or off. When the temperature of the return water to the heater drops to the temperature set, the fire automatically lights up and heats the coolant about 20 deg, at which point the fuel is cut off while circulation continues to keep the whole engine warm.

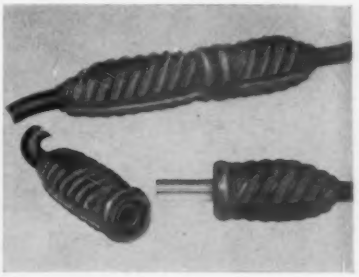
The Watchman heater puts out 125,000 Btu per hr at 80 percent efficiency when full-on using a fuel nozzle with a capacity of 1.25 gal per hr. However, in normal winter weather the heater is not usually burning fuel more than half the time, which means the unit is consuming less than ¾ gal per hr (compared to 2½ to 3½ gal per hr when idling).

The one motor drives the blower for the fire, the circulating water pump, and the fuel pump. Continuous ignition spark is supplied by a transformer. There are several protective controls such as fuses, overload cutout, outfire relay, water temperature limit switch and an alarm bell circuit to notify shop men if the unit is not working properly.

The heaters may also be supplied with 220-volt ac motors, dc motors or gasoline engines when used as portable units. They may be made to burn either diesel fuel oil, gasoline or propane gas. A 1.50 gal per hr fuel nozzle may also be used to increase the output to 150,000 Btu per hr.

Vapor Heating Corporation, 80 East Jackson Boulevard, Chicago 4.

■



Electrical Connector

Only a push and a twist are necessary to complete a tight electrical connection with a new type of heavy-duty, single-conductor, electrical connector for quick poining or disconnecting of portable cables. Although no screws, clamps or other mechanical joining devices are employed, the connector cannot be pulled apart or disconnected accidentally. It is disconnected by a twist and a pull.

Basically, the unit is composed of two sections—one with a male contact, the other with a female contact. All principal parts are of heavy-gauge copper, and wires are connected to the plug ends by set screws. The copper contacting parts give a wiping pressure contact. Covering the contacts are resilient molded rubber handles, which provide insulation and prevent moisture from reaching the contacts.

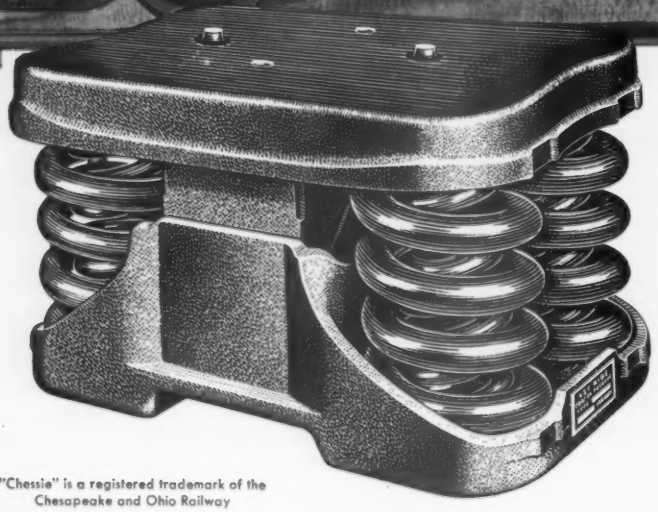
The connector is recommended by the manufacturer for either indoor or outdoor service for such applications as line repair operations, lifting magnets, welding machines, battery chargers, tap changers, motor connections, testing equipment, air compressors and other portable machinery.

The unit is available in two sizes. Model

(Continued on page 102)

On the Chesapeake and Ohio, 6000 older cars are being equipped with ASF Ride-Control® Packages . . . so that

Now even "Chessie"®



"Chessie" is a registered trademark of the Chesapeake and Ohio Railway

The C&O is on record as being ". . . vitally interested in any plan that will move more goods, more efficiently." They found one answer in the self-contained, easy-to-install Ride-Control Package. In minutes, the Package-equipped car is ready to roll—almost as smoothly as a brand-new car on Ride-Control Trucks!

TEST RUNS—BEFORE AND AFTER PACKAGE INSTALLATION—SPEAK FOR THEMSELVES!

can ride their freights!

"Chessie" has long been a symbol of smooth, safe travel on crack C&O passenger fleets. Today, more than ever before, the same applies to their freight service.

Current modernization on the C&O calls for bringing some 6000 older cars up to modern riding standards with ASF Ride-Control Packages. Result: *cars that ride over fifteen times more smoothly!*

But aside from the obvious mechanical advantages is the equally important question of *economics.*

In deciding to use Packages extensively, the C&O considered the fact that a car available only for restricted use represents a potential revenue loss . . . that a more efficient car pool is the answer to carrying more freight per dollar invested in rolling stock . . . that safer hauls at higher speeds build traffic.

Not *all* older cars are equipped with Packages, of course. Some are so close to retirement that they don't justify even this small an investment. So each older car is evaluated as to its over-all condition. In short, the C&O Package program is sound economics in *practice* as well as in theory.

Would a similar program be practical on your road? *The facts prove that it's worth investigating.* Now is the time to find out why a small per-car investment in Ride-Control Packages can pay you big returns!

Bring your older cars up to modern riding standards . . . with

ASF® Ride-Control® Packages

AMERICAN STEEL FOUNDRIES

410 N. Michigan Avenue, Chicago 11, Illinois

Canadian Sales: International Equipment Co., Ltd., Montreal 1, Quebec

(Continued from page 12)

the Suydam division, succeeds Mr. Post at Torrance, and *George P. Myers*, assistant general sales manager industrial finishes, succeeds Mr. Mather as sales manager of the Suydam division.

■

BALDWIN-LIMA-HAMILTON CORPORATION, STANDARD STEEL WORKS DIVISION.—new sales representatives have been appointed for the following territories: Syracuse, *Francis W. Klotz;* Pittsburgh, *Philip E. Pacini*, and central Pennsylvania, *Robert T. McClellan.*

■

AIR REDUCTION SALES COMPANY. —*D. F. McCandlish*, manager of the district office in Chicago, has been appointed

H. F. Colt, Jr.

regional manager of the North Central region in Chicago. *S. S. Bruce, Jr.*, zone manager, eastern region of Airco's Railroad Department, succeeds Mr. McCandlish as Chicago district manager. *H. F. Colt, Jr.*, manager of the El Paso, Tex., district, succeeds Mr. Bruce as zone manager at Philadelphia.

■

HYSTER COMPANY.—*Les Jensen*, assistant to supervisor of industrial truck design, has been named eastern division sales engineer.

■

UNITED STATES STEEL CORPORATION.—*Warren F. Hjerpe* has been appointed assistant district manager of the United States Steel Supply division at Chicago, succeeding *Earl L. Simanek.*

■

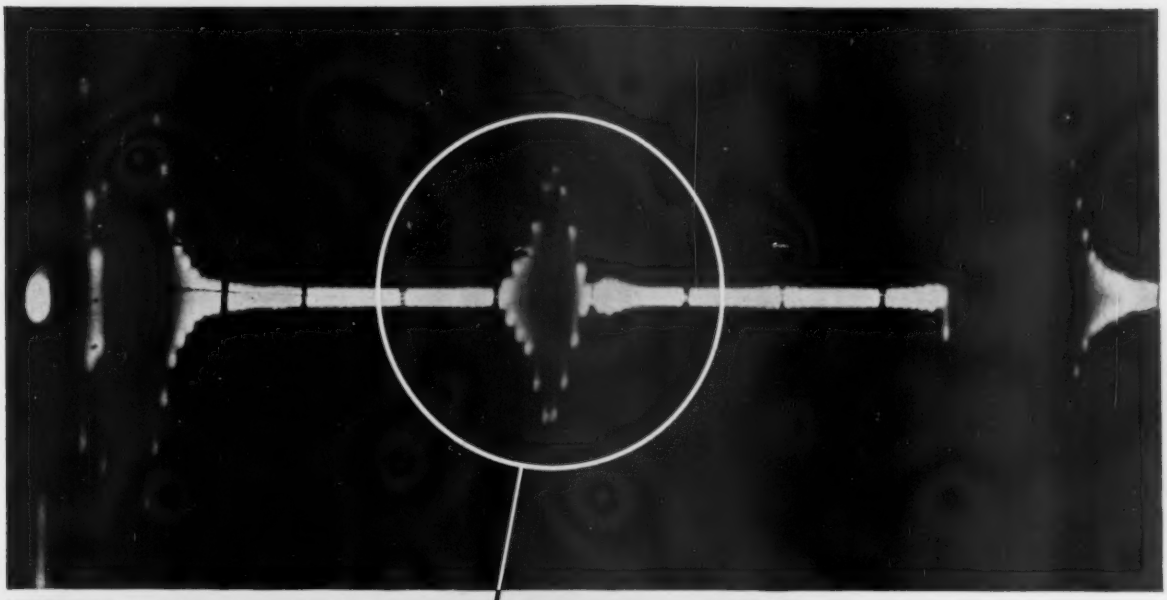
PITTSBURGH SCREW & BOLT CORP. —*William N. Hoelzel* has been appointed general manager of sales, and *John C. Jewett* assistant general manager of sales of Pittsburgh's Gary Screw & Bolt division.

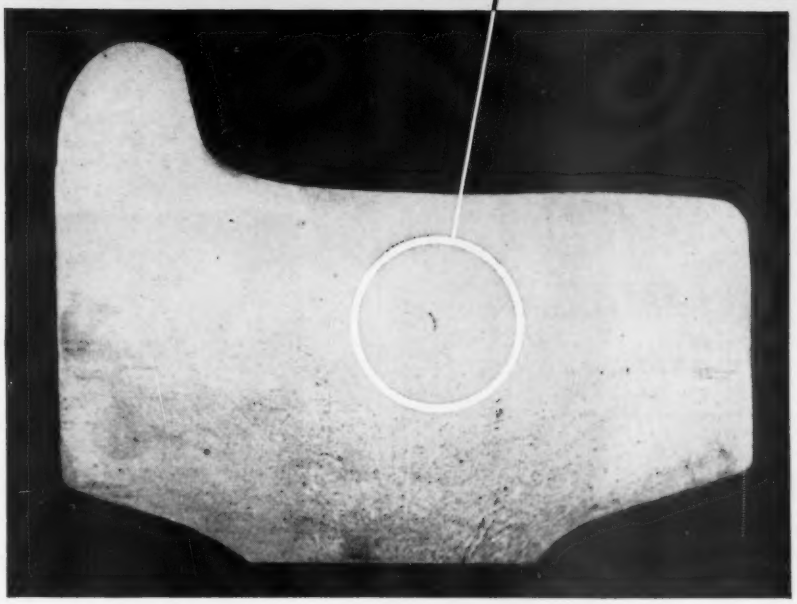
■

EQUIPMENT RESEARCH CORPORATION.—*Paul A. Cavett*, formerly western sales manager of Ajax-Consolidated Company, has been elected vice-president of Equipment Research at Chicago.

■

NATIONAL PNEUMATIC COMPANY —HOLTZER-CABOT DIVISIONS. — *Harvey J. Finison*, formerly with Armour Research Foundation, has become director of engineering for National and Holtzer-Cabot, Boston.





This is what the Armco wheel inspector saw on the reflectoscope screen. Graduations on the screen located a discontinuity 3 inches in from the back face of the rim directly under the searching crystal.

Here's the actual wheel rim after taking a cross-section at the point where the discontinuity was indicated by the reflectoscope. This defect measures almost exactly 3 inches from the back face of the rim—just where the reflectoscope showed it would be. (Photo ¾ size)

Make sure that your diesel wheels are sound

The defect shown here is an actual discontinuity in a wheel rim. It's at points like this that progressive internal rim fractures can start. Armco inspectors locate these discontinuities by reflectoscope and pass or reject wheels on standards of acceptance agreed to.

Armco research men who have made a thorough study of sonic testing are convinced of its reliability as a test method. That's why Armco recommends that all wheels for diesel service be sonic tested.

If you are interested in stronger, safer diesel wheels, let us supply you with *reflectoscope-tested* wheels. Just write us, or phone the nearest Armco sales office.

ARMCO STEEL CORPORATION

4424 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

WESTINGHOUSE AIR BRAKE COMPANY, AIR BRAKE DIVISION.— *R. A. Mitchell* has been appointed district engineer for the central district, with headquarters at Wilmerding, Pa. Mr. Mitchell

R. A. Mitchell

was previously service engineer in the central district.

■

GENERAL STEEL CASTINGS CORPORATION.—*G. Fred Driemeyer*, vice-president—sales at Granite City, Ill., has been elected president of Commonwealth

Howard F. Park, Jr.

Sales Corporation, export sales agent for the parent company. Mr Driemeyer continues as a vice-president, in which capacity he will direct the company's foreign sales activities. *Howard F. Park, Jr.*, manager of sales succeeds Mr. Driemeyer as vice-president in charge of domestic sales.

■

FAIRBANKS, MORSE & CO.—*E. C. Golladay*, manager, railroad department at Chicago, has retired and has been succeeded by *William G. Herzig*, field engineer.

■

JONES & LAMSON STEEL CORPORATION.—Construction has started on a new J&L research center on Baldwin Hill, overlooking the company's Pittsburgh works. The laboratory, to be completed in mid 1955, will consist of several air-conditioned buildings and house a re-

the inside story of the chilled car wheel

a 10-year record of improved values

1941-1946 Improved Control of mottled iron formation, providing clearer chill at tread and more impact resistant gray iron backing.

1945 AMCCW plants adopt limitation on chill depth in rim.

1945 Rim thickness increased.

1947 More rigid inspection and standards for rotundity adopted for wheels shipped from AMCCW plants.

1950 New wheel design features heavier tread (stronger flange and rim) and more brackets (thicker, heavier, more continuous flange support).

1951 New wheel design advanced from "Recommended Practice" to "AAR standard."

In good supply • Available locally
Short-haul delivery • Reduced inventory
Low first cost • Low exchange cost
Increased ton mileage • High safety standards
AMCCW plant inspection • Easier shop handling

Quick, low-cost delivery of chilled car wheels from the AMCCW plant near you.

AMCCW

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

445 North Sacramento Boulevard, Chicago 12, Ill.

Albany Car Wheel Co. • ACF Industries, Inc.
Marshall Car Wheel & Foundry Co. • Griffin Wheel Co.
Pullman Standard Car Mfg. Co. • Southern Wheel (American Brake Shoe Co.)

search staff of about 100. The more theoretical aspects of J&L's research will be moved to the new center. Research at most of the existing locations will be continued.

■

INDUSTRIAL BROWNHOIST CORPORATION.—*Warwick J. Hayes Jr.*, sales representative at Cleveland, has been named general sales manager at Bay City, Mich. *Stanley R. See*, district sales manager at Philadelphia, has been appointed director of sales, eastern division, including New York and Philadelphia offices.

■

COOPER-BESSEMER CORPORATION.—*Robert F. Lay* has been appointed assistant general sales manager and Eugene L. Miller, assistant general manager. Mr. Lay was previously chief engineer of Cooper-Bessemer's Product Division, and Mr. Lay, supervisor of application engineering.

■

VAN DER HORST CORPORATION OF AMERICA.—Van der Horst has set up production facilities for the reclamation of diesel locomotive air compressor cylinders at Olean, N. Y.; Terrell, Tex., and at the Los Angeles plant of the Spar-Tan Engineering Company.

■

WELLMAN ENGINEERING COMPANY.—Wellman has acquired the Locomotive Crane Division and plant of the Browning Crane & Shovel Co., Cleveland. The locomotive crane organization will be known as the Wellman-Browning Locomotive Crane Division of the Wellman Engineering Company. Browning truck and wagon cranes will continue to be manufactured by Browning Crane & Shovel.

■

A-P CONTROLS CORPORATION.—*Del Moerick* has been appointed vice-president, sales, and *A. L. Topp*, vice-president, engineering. Mr. Moerick was formerly general sales manager, and Mr. Topp, director of engineering over oil, gas and refrigeration.

■

KSM PRODUCTS, INC.—*Richard H. Sawyer*, formerly a distributor for KSM products with the Hays Supply Company, Memphis, Tenn., has been assigned to Birmingham, Ala., to open a new KSM engineering sales district.

■

BECK & BLATCHFORD, INC.—*Karl T. Nystrom* has been named vice-president at Chicago.

■

KERITE COMPANY.—Kerite celebrated its centennial on June 10 at its plant in Seymour, Conn., where it began operations in 1854. Officers from industries in Connecticut's Naugatuck Valley region, and local and state political leaders were guests.

■

GENERAL MOTORS CORPORATION, HYATT BEARINGS DIVISION.—*H. Ralston Gibbons* has been appointed technical assistant to the general manager. *Carl W. Kalchthaler*, assistant to the general sales manager at the Harrison, N. J., plant, succeeds Mr. Gibbons as chief engineer of the Hyatt division.

■

UNION CARBIDE & CARBON CORP.—*Dr. Augustus B. Kinzel* has been appointed director of research, with headquarters in New York.

■

VANADIUM CORPORATION OF AMERICA.—*Roy F. Hancock*, formerly assistant to vice-president, sales, Vanadium, has been appointed assistant vice-president, with headquarters in New York.

■

WHITING CORPORATION.—*Bernard L. Heinen* has been assigned to the Houston, Tex., district office; *Ernest V. Piazza* has been transferred from the district sales office in Cincinnati to the St. Louis district; *Charles D. Schmidt* has been assigned to the New York district sales office, and *A. C. Patsavas* has been assigned to the Cincinnati district sales office.

■

CATERPILLAR TRACTOR COMPANY.—*Harmon S. Eberhard*, executive vice-president, at Peoria, Ill., has been elected president, to succeed *Louis B. Neumiller*, who becomes chairman of the board. *G. E. Burks*, director of engineering, has been appointed director of engineering and research, at Peoria.

Obituary

GERALD K. SWALLOW, sales manager of the railroad products division of the Continental-Diamond Fibre Company, Newark, Del., died on May 16. Mr. Swallow had been with the company for 35 years.

IN SHOPS OR ON TRACK

use OXWELD Trade-Mark REGULATORS

for dependable control in oxy-acetylene welding or cutting

Whether you're using oxy-acetylene blowpipes in shops or out on track, for big or little jobs, you'll find an Oxweld regulator especially designed to meet every work situation. You can depend on Oxweld regulators to provide wide-range yet highly sensitive control of oxygen and acetylene for the many different welding and cutting applications to be found on railroads. And when Oxweld regulators are on the job you'll discover efficiency going up, costs coming down.

"OXWELD" REGULATORS OFFER YOU THESE ADVANTAGES:

1 MAXIMUM STRENGTH

Only tested, high-strength materials are used in construction assuring longer service life.

2 LARGE FLOW CAPACITIES

Greater than found in any competitive line of regulators.

3 HIGH DEGREE OF SENSITIVITY

Fabric-reinforced rubber diaphragm contributes to excellent regulator sensitivity.

4 WIDE WORK RANGE

Regulators available for every type of welding or cutting job under any operating condition.

5 IDEAL FOR RAILROAD APPLICATIONS

Efficient design and unrivaled quality of workmanship is consistent with the high standards demanded of equipment used by American railroads.

Mail Coupon

below to receive an illustrated catalog which gives detailed information and suggested applications for all OXWELD regulators. ▼

OXWELD RAILROAD SERVICE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company
Division of Union Carbide Canada Limited, Toronto

Oxweld Railroad Service Company
Room 1320
230 N. Michigan Avenue
Chicago 1, Illinois

Please send me, free of charge, my copy of the OXWELD regulator catalog.

Name .....

Railroad .....

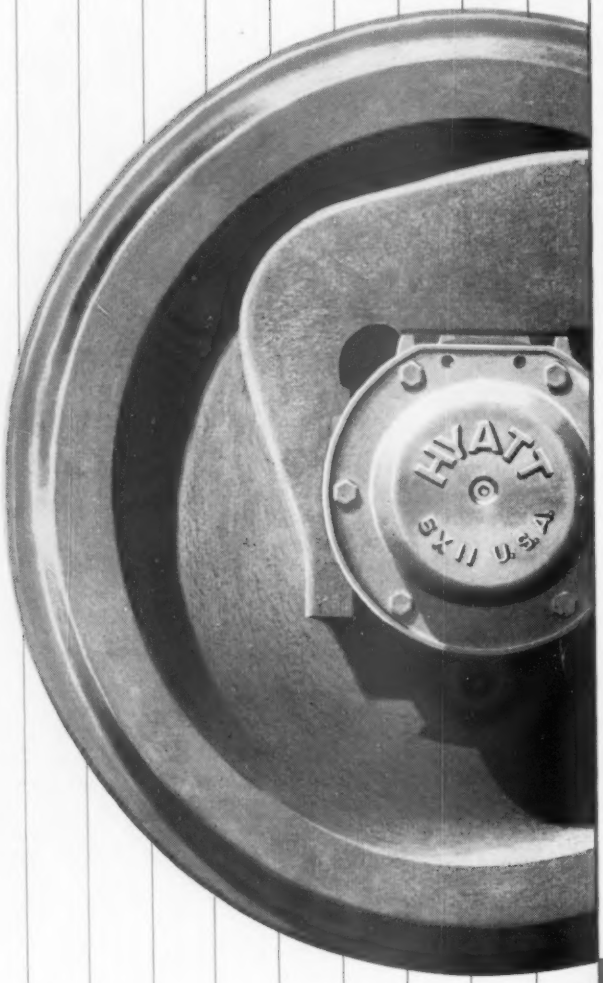
Street .....

City .....Zone.....State.....

The term "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

HYATT REDUCES PRICES ON FREIGHT CAR JOURNAL BOXES

New design retains all superior Hyatt features



HYATT research has done it again! Without the slightest sacrifice of quality or performance, we have found a way to cut the cost of equipping freight cars with roller bearings—*substantially!*

These new HYATT Roller Bearing Journal Boxes for freight cars give you ease of assembly and removability—shock-reducing free lateral—and *all* of the other superior features that have made HYATTS so successful in the past.

Improved techniques have enabled us to make significant savings in production costs—which are now passed on to you.
If you are currently considering a roller bearing installation, by *all* means get *all* the facts on these new HYATT boxes before you buy. If a HYATT representative hasn't already contacted you, *wire, write or phone us for full details—today!*
Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

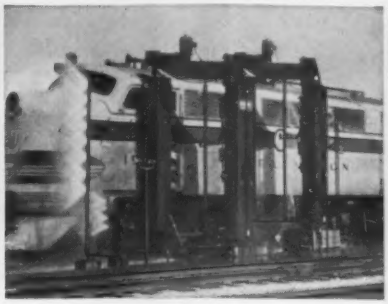
HYATT

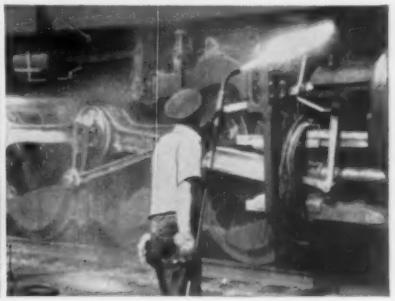
STRAIGHT ◯ BARREL ◯ TAPER ◯

REDUCE HAND-WASHING COSTS! Like all Wyandotte cleaners, RILLON* keeps costs down. See page 10 in free Wyandotte book.

SAVE ON MACHINE WASHING! Enjoy lowest use-cost with a Wyandotte product in your mechanical washer. Page 12, Wyandotte book.

CUT STEAM-CLEANING OVERHEAD! Special Wyandotte products for specific steam-cleaning jobs cost little to use. See free book.





The *story* behind the low use-cost of Wyandotte cleaning products

Wyandotte's close control, from raw material to finished product, helps cut cleaning costs for railroads

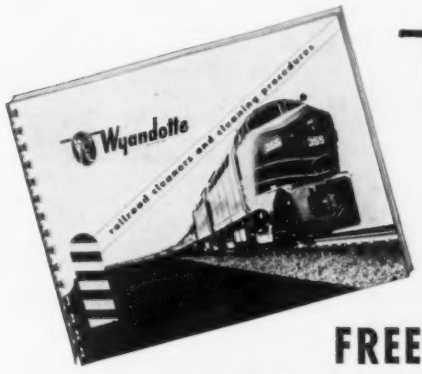
Buying cleaning products on price is good business — but only if it results in *low use-cost.*

The story behind the low use-cost of Wyandotte cleaning products is that of a basic producer . . . using its own raw materials . . . with quality control of both raw materials and finished products . . . plus on-the-job technical service, and the unequalled research facilities.

Wyandotte's *complete* line of railroad-cleaning products is backed by over 60 years' manufacturing experience. Finished-product standards are *guaranteed,* whether you order one drum or a thousand — a guarantee unique in the industry.

Your Wyandotte man is an expert on railroad cleaning. Call him in, today, to tell you about Wyandotte's low use-cost in relation to *your* cleaning needs. *Wyandotte Chemicals Corp., Wyandotte, Mich. Also Los Angeles 12, Calif.*

*REG. U.S. PAT. OFF.



FREE!

RAILROAD-CLEANERS AND CLEANING-PROCEDURES BOOK

Wyandotte's railroad-cleaning book covers every cleaning job, from locomotives to buildings — in 50 fact-filled pages! It's a *must* for complete, low-cost cleaning procedures. Send for your free copy, today!

Wyandotte CHEMICALS

Helpful service representatives in 138 cities in the U. S. and Canada

Wyandotte Chemicals Corporation
Wyandotte, Michigan

☐ Please send me free copy of Wyandotte book, "Railroad Cleaners and Cleaning Procedures."

☐ Please have a representative call.

Name_____

Railroad_____

Department_____

Address_____

City_____ State_____

NEW DEVICES

(Continued from page 91)

MF-2 may be used for wire sizes from No. 8 to No. 0 stranded for currents up to 200 amp. Model MF-4 is made for wire sizes from No. 2 to No. 00 stranded and for currents up to 400 amp.

H. W. Earl Company, Coral Gables, Fla.

■

Explosion-Proof Light Fixture

An explosion-proof lighting fixture with prismatic Holophane reflector now available provides for good illumination in locations where explosion-proof fittings are required.

Developed cooperatively by the Crouse-Hinds Company and Holophane engineers, the new EV series lighting fixture compares favorably in lighting characteristics with ordinary non-explosion-proof lighting fixtures. When equipped with an inside-frosted 5900-lumen, 300-watt lamp, it delivers a total light efficiency of 72.3 per cent. Only a small portion of light is transmitted upward through the glass reflector. Most of the light rays striking the reflector's surface are refracted directly downward to the work area. These effects provide good illumination and also give the fixture a pleasant appearance, free from contrasting light and shadow.

To be completely safe in locations where there is the possibility of flammable gases being present, the fixture's lamp and wiring compartments are individually explosion-proof. Its cast aluminum construction can resist internal explosions without damage and its flame-tight threaded joints, which require no seals or sealing compounds, prevent the escape of flames or gases into the outer atmosphere.

Crouse-Hinds Company, Syracuse, N. Y.

■

Light Weight Vinyl Upholstery

A burnished antique finish gives this new fabric a leather like appearance. It has a soft, pliable hand that is said to offer good

(Continued on page 104)

workability in tailoring and sewing.

The abrasion resistant covering, a 25-oz knit-backed upholstery of high tensile strength, is available in a 52-in. width. It is marketed in six colors: red, green, lime, brown, grey and saddle tan.

Goodall Fabrics Inc., New York.

■

Chargers for Edison Batteries

Three models of battery chargers are available to cover charging requirements of nickel-Iron-alkaline batteries, in sizes ranging from 10 to 42 cells. Model S9640 is designed for batteries of 10 to 15 cells that are used with the walkie-type trucks. Model S6088 is for 10 to 30-cell batteries for heavy-duty trucks of both the walkie and rider type. Model S9607 charges nickel-iron-alkaline batteries with 21 to 42 cells.

The machines give a constant current charge as recommended by Edison. The correct charging rate for any battery is set with a single charging current control. The only other control required for operation of the unit is the time control. This automatically starts the unit, connects the battery to charging circuit and stops the unit when the batery is fully charged. A completely discharged battery can be brought up to full charge in seven hours.

Batteries are fully protected during the charging cycle as recommended by the Industrial Truck Association. In the event of power supply failure during charging, the unit is disconnected from the power line, and the charging circuit is opened. Charging automatically restarts with the resumption of power supply.

The chargers are motor generators of compact design and welded steel construction. Models S-9640 and S-6088 have a vertically mounted armature, the upright design requiring only 3½ sq ft of floor space. Model S9607 is a horizontal type machine. Construction is drip-proof and all electrical and rotating parts are enclosed. The motor rotor, generator and exciter are mounted on a single large shaft, dynamically balanced and mounted on two large bearings.

Lincoln Electric Company, Cleveland, Ohio.

■

Gasket Cement Remover

Stripit, used for the removal of paints and enamels prior to painting, has proven useful in the railroad field to remove form-a-gasket and other cements from diesel engine parts.

The surface of the cement to be removed is first brushed with the concentrated material and soaked for a short time. Then the deposit is easily removed with a putty knife or scaper, right down to the metal. Formerly, removal caused much waste of time in hand scraping even after use of solvents and removers.

Magnus Chemical Company, Garwood, N.J.

■

Arc Welding Benches

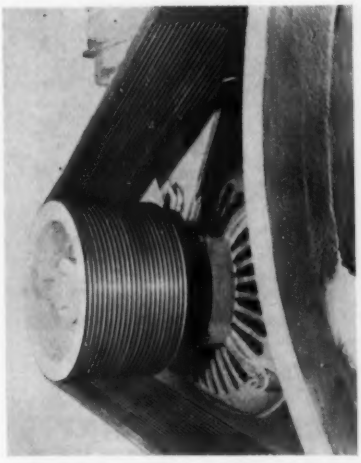
A series of arc welding benches with 36½-in. x 36½-in. tops that will stand without end or wall supports, has been introduced by Industrial Bench and Equipment Manufacturing Company, Inc. Fitted with a 30-in. high glare shield on three sides, the benches feature Industrial Equipment

design legs, electrically welded into formed sections. The bench surface is 33⅝ in. high. The benches are equipped with a bench drawer, measuring 18 in. x 22 in. x 5 in., and a shelf with partitions for holding welding rods.

Not furnished as regular equipment, fire brick 9 in. x 4½ in. x 2½ in., may be installed on the top. A choice of lock or padlock attachment is available for the theft-proof steel drawer, which will not bind or cramp.

Industrial Bench and Equipment Manufacturing Company, Inc., New Britain, Conn.

■



Single-Piece Multiple V-Belt

The Poly-V belt is a single, endless rubber belt with a series of parallel V ribs molded lengthwise around the inside circumference. It has an uninterrupted, high-strength member of synthetic cords across its entire width.

The Poly-V sheave grooves are designed to mate precisely with the belt ribs, and since the belt covers the full width of the drive member, the load is distributed equally over the entire driving surface. The

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the information desired; the requests will be sent direct by the manufacturers.

1. COUNTERBORES. *Ex-Cell-O Corporation.* 8-page bulletin 60446 "Standard Continental Counterbores" describes and gives sizes of holders, counterbores, countersinks and pilots.

2. BLAST CLEANING. *Pangborn Corporation.* 24-page bulletin 1210 "Pangborn Blast Cleaning—Dust Control" is a condensed catalog of the entire line of blast cleaning and dust control equipment and accessories.

3. METAL PROTECTIVE CHEMICALS. *American Chemical Paint Co.* 8-page booklet (1171A) lists metal-protective, paint-bonding chemicals for steel, zinc, aluminum, and other metals.

4. ELECTRONIC REGULATOR. *Reliance Electric and Engineering Co.* 2-page bulletin (K-2076) describes and illustrates the newly developed electronic regulator (Reliance VSR) for speed, voltage, and current (tension) regulation for industrial electric motor drives.

5. VAPOR DEGREASING. *Manufacturers Processing Company.* 24-page Manpro Manual "Vapor Degreasing Do's and Don'ts" covers every phase of metal cleaning through vapor degreasing, including safety, personnel, correct layout and maintenance of equipment, efficient operations, drainage.

6. RAIL DIESEL CARS. *The Budd Company.* 24-page multi-color plastic bound brochure "More About RDC" contains typical stories about the Budd rail diesel car RDC which have appeared as advertisements in *Railway Age.*

7. WELDING & CUTTING EQUIPT. *The K-G Equipment Company.* Catalog 54E "The Finest Welding & Cutting Equipment" describes, illustrates, gives specifications on K-G line, includes 4-page apparatus price list.

8. MACHINE TOOLS. *Giddings & Lewis Machine Tool Co.* 32-page general catalog #54 pictures, describes and gives specifications for the G & L line of modern machine tools, including horizontal boring, drilling and milling machines, planers, lathes, contouring machines, accessories and attachments.

9. WELDING ELECTRODES. *A. O. Smith Corporation.* 24-page bulletin WE-166 "Stainless Steel Welding Electrodes" details the metallurgy of stainless steels, gives a Smith stainless steel electrode selector table, describes A. O. Smith welding electrodes in detail.

10. WELDING ALUMINUM. *Aluminum Company of America.* 176-page book "Welding Alcoa Aluminum" illustrates and describes all of the practical methods for welding aluminum.

11. CEMENTED CARBIDE PRODUCTS. *Kennametal Inc.* New 24-page price list 54-A offers "New Lower Prices" applying to catalog 54 (which gives complete specifications of the Kennametal line of cemented carbide tools); *write-in below* if catalog is desired also.

12. BEARING BRONZE. *American Smelting & Refining Co.* 6-page bulletin "Asarcon 773 Continuous-Cast Bearing Bronze" describes in detail the patented process by which bronze alloys are cast into rods, tubes, and shapes of many different diameters and profiles.

13. POWER DRIVEN BRUSHES. *C. W. Morris Company.* 16-page 2-color booklet "Production Proven Power Brushes" describes, illustrates and gives application data and specifications for the Morris line of power driven brushes.

14. DRILLING MACHINES. *Bryant Machinery & Engineering Co.* 12-page catalog 600 "Cleereman Drilling Machines" describes, illustrates and gives specifications for Cleereman drilling machines, including the Round Column and Box Column models.

15. STEEL SHEET WEIGHT. *Armco Steel Corporation.* Handy sheet weight plastic slide-rule type calculator makes finding of weights for many types of steel sheets easy; reverse side has a gage, weight and thickness table for stainless steel, hot and cold rolled mild steel sheets, strip and plates.

16. LOCOMOTIVE CABLE. *General Electric Co.* Specification folder "G-E Diesel-Electric Locomotive Cable" describes, illustrates and gives specifications for the single type of cable G-E Versatol Geoprene.

17. DIESEL ELECTRIC PILE DRIVER. *Industrial Brownhoist Corp.* Complete information offered on the new heavy-duty Diesel electric full revolving pile driver, with maximum leader load of 26,000 lbs.

Reader Service Department — AUGUST, 1954
Railway Locomotives and Cars
30 Church Street, New York 7, N. Y.

Please send literature circled below:

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10 11 12 13 14 15 16 17

Also, please send me additional product information as follows: (company, product & page number) .....

Name ..... Title or Position .....
Company .....
Address .....
City ..... Zone ..... State .....

manufacturer states that this provides twice the contact area of a comparable multiple V-belt application, so that Poly-V drive will transmit up to 50 per cent greater horsepower with the same width, or equal horsepower with ⅓ less sheave width.

The drive is also said to reduce face pressure one-half, giving long life to belt and sheaves. Another feature is that the belt cannot turn over. Poly-V belt is available in two cross-sections—No. 187 and No. 375. These two sizes meet all drive requirements from 3-in. pitch diameter sheaves and 50-in. belt pitch lengths upward.

Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J.

■

Alkaline Cleaner

An alkaline cleaner for use in mechanical spray washers prior to phosphate coating and said to have broad application in metal fabricating eliminates caustic soda, making the crystalline structure of the phosphate coating finer and more effective.

Tho formulation may be used at varied concentrations and temperatures for the removal of oils and greases from fabricated parts. Concentration of compound is dependent upon type and degree of soil involved. The compound will not foam excessively at high concentrations, created by high water hardness in certain areas. It permits saponification as well as emulsification of soils when in solution.

Detrex Corporation, Detroit, Mich.

—ADVERTISERS IN THIS ISSUE—

How Well Does Your Present Source Compare With National's COMPLETE Facilities For Motor and Generator Repair

Most motor repair shops can perform some of the operations listed below. Very few can handle them all. These are not routine operations, but extras which require expensive specialized equipment and experience. National service includes all 17 operations. How does your present repair source compare?

plus value operation	*available at National*	*at your present repair source*
1. redesigning and modernizing by competent engineers	yes	
2. vapor degreasing to insure good bonding of varnish	yes	
3. corncob blasting to prepare surfaces like new	yes	
4. rebuilding and remachining to standard of mechanical fits	yes	
5. temporary hotbanding to seat coils in slots	yes	
6. hot rerolling of permanent bands	yes	
7. grinding and polishing of journal shafts	yes	
8. vacuum impregnating	yes	
9. dynamic balancing	yes	
10. grinding and polishing of commutator at top operating speed	yes	
11. load testing	yes	
12. high frequency testing	yes	
13. electronic bar-to-bar and high sensitivity ductor testing	yes	
14. surge comparison testing	yes	
15. high potential ground testing	yes	
16. magniflux testing	yes	
17. anti-friction bearing inspection	yes	
Total	17	

If you can't answer "yes" for your present source on all 17 operations, you're taking unnecessary chances on getting less than the best repair work. You can't tell in advance on which jobs National equipment and National know-how will pay off in improved performance or longer life. So play it the one safe way — make National your first source for *all* motor and generator repairs.

For more details on why the motor or generator you send to National will often come back better than new, call your nearby National field engineer today. Or drop us a line for his name and address.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A. TRADE MARK

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

This month Dr. Oscar Horger demonstrates that absence of lateral movement is one reason why:

The taper makes TIMKEN® the only journal bearing that delivers what you expect when you buy a roller bearing

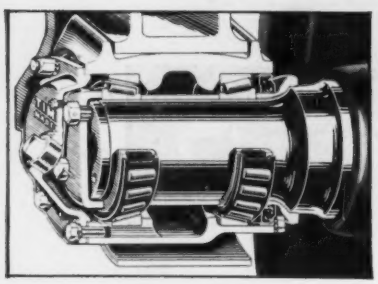
RAILROADS are switching to roller bearings to: 1) end the hot box problem, 2) cut operating and maintenance costs to a minimum; other advantages are secondary. And the Timken® tapered roller bearing is the *one* bearing you can count on to do this. It's the taper! Here's why:

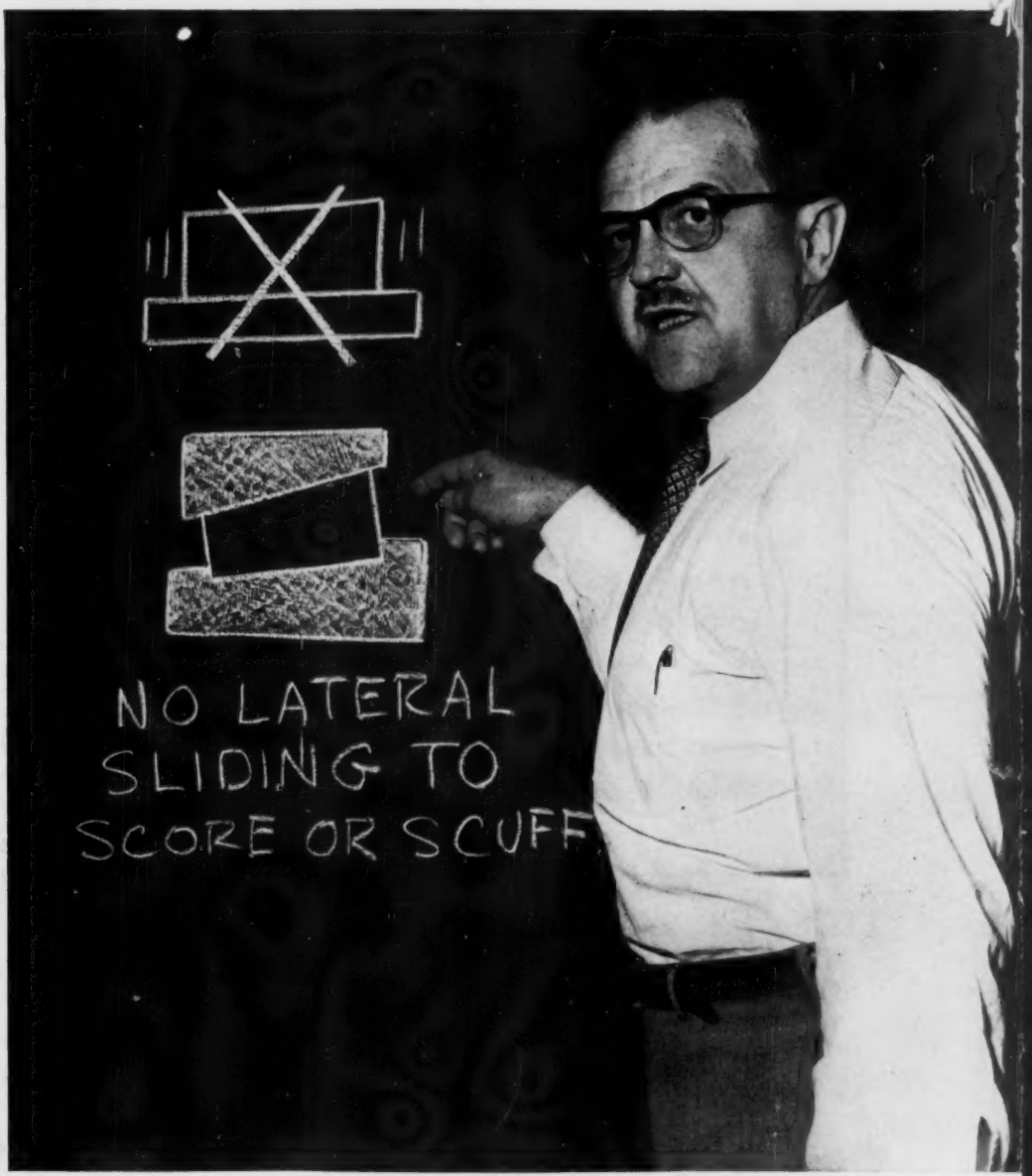
1) *No lateral movement within the bearing.* In straight roller designs, incessant lateral movement scuffs rollers and races, shortening bearing life. Lubricant is pumped through the seal and out of the journal box, dirt and water are drawn in. The auxiliary devices, needed to take thrust loads, are hard to lubricate with grease and need more maintenance.

The taper in Timken bearings prevents lateral movement, takes thrust loads. Because Timken bearings always roll, there's no scoring, scuffing or pumping. Result: the hot box problem is eliminated. Less maintenance and lubricant are needed. Bearing life is increased.

2) *Positive roller alignment.* The taper holds roller ends snug against the rib, where wide area contact keeps rollers aligned. There's no skewing of rollers to upset full line contact, shorten bearing life.

Get what you pay for when you switch to roller bearings to end the hot box problem and cut operating and maintenance costs to a minimum. Get Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".





THE TAPER MAKES TIMKEN THE BEARING YOU TRUST

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊂⊃ AND THRUST →⊂⊃← LOADS OR ANY COMBINATION